IEI Technology Corp.

NOVA-8522G2

Pentium M/Celeron M Dual Independent Display 5.25" Motherboard with Dual SATA, CF II and RAID Support

User Manual

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RoHS Lead Free

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Glossary

AC ’97	Audio Codec 97
ACPI	Advanced Configuration and Power Interface
APM	Advanced Power Management
ARMD	ATAPI Removable Media Device
ASKIR	Shift Keyed Infrared
ATA	Advanced Technology Attachments
BIOS	Basic Input/Output System
CFII	CompactFlash Type 2
CMOS	Complementary Metal Oxide Semiconductor
CPU	Central Processing Unit
Codec	Compressor/Decompressor
COM	Serial Port
DAC	Digital to Analog Converter
DDR	Double Data Rate
DIMM	Dual Inline Memory Module
DIO	Digital Input/Output
DMA	Direct Memory Access
EIDE	Enhanced IDE
EIST	Enhanced Intel SpeedStep Technology
FDD	Floppy Disk Drive
FDC	Floppy Disk Connector
FFIO	Flexible File Input/Output
FIFO	First In/First Out
FSB	Front Side Bus
IrDA	Infrared Data Association
HDD	Hard Disk Drive
IDE	Integrated Data Electronics
I/O	Input/Output
ICH4	I/O Controller Hub 4
L1 Cache	Level 1 Cache
L2 Cache	Level 2 Cache
LCD	Liquid Crystal Display
LPT	Parallel Port Connector
LVDS	Low Voltage Differential Signaling
MAC	Media Access Controller
OS	Operating System
PCI	Peripheral Connect Interface
PIO	Programmed Input Output
PnP	Plug and Play
POST	Power On Self Test
RAM	Random Access Memory
SATA	Serial ATA
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology
SPD	Serial Presence Detect
S/PDI	Sony/Philips Digital Interface
SDRAM	Synchronous Dynamic Random Access Memory
SIR	Serial Infrared
UART	Universal Asynchronous Receiver-transmitter
USB	Universal Serial Bus
VGA	Video Graphics Adapter

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Chapter

1

Introduction

1.1 NOVA-8522G2 Overview

The 5.25” NOVA-8522G2 socket 479 Pentium M and Celeron M single board computer (SBC) is fully equipped with advanced multi-mode I/Os. The NOVA-8522G2 is designed for system manufacturers, integrators, and VARs that want performance, reliability, and quality at a reasonable price.

1.1.1 NOVA-8522G2 Models

The NOVA-8522G2 series has six models:

- NOVA-8522G2-R10
- NOVA-8522G2-800Z-R10
- NOVA-8522G2-1GZ-R10
- NOVA-8522G2-DVI-R10
- NOVA-8522G2-800Z-DVI-R10
- NOVA-8522G2-1GZ-DVI-R10

The specifications for the four models are show in **Table 1-1**.

NOVA-8522G2	-R10	-800Z-R10	-1GZ-R10	-DVI-R10	-800Z-DVI-R10	-1GZ-DVI-R10
Onboard CPU	NO	CM800Z	CM1GZ	NO	CM800Z	CM1GZ
CRT/LCD	YES	YES	YES	YES	YES	YES
Dual GbE	YES	YES	YES	YES	YES	YES
SATA	YES	YES	YES	YES	YES	YES
Audio	YES	YES	YES	YES	YES	YES
DVI Function	NO	NO	NO	YES	YES	YES

Table 1-1: NOVA-8522G2 Model Specifications

CM800Z : Intel Celeron M 800MHz / zero cache CPU

CM1GZ : Intel Celeron M 1GMHz / zero cache CPU

1.1.2 NOVA-8522G2 Applications

The NOVA-8522G2 is designed for applications in the following areas:

- Industrial PC applications
- Human Machine Interface (HMI) applications
- Marine, GPS and transportation applications
- Financial, retail and kiosk applications

1.1.3 NOVA-8522G2 Benefits

Some of the NOVA-8522G2 benefits include:

- Low power, high performance
- Flexible dual display options
- Multiple storage option integration including
  - 40 Pin IFM or 3.5” HDD (hard disk drive)
  - 44 Pin IFM or 2.5” HDD (hard disk drive)
  - Dual SATA ports with RAID 0 and RAID 1 support
  - CFII (CompactFlash) support
  - Floppy disk drive (FDD) support
- Mini PCI
- SATA RAID support

1.1.4 NOVA-8522G2 Features

Some of the NOVA-8522G2 features are listed below:

- 5.25” form factor
- RoHS compliant
- Socket 479 Intel® Pentium M/Celeron M processors supported
- Dual-independent display functionality
- Maximum front side bus (FSB) speed up to 400MHz supported
- Up to 2GB of 266MHz of DDR memory supported
- Two high performance gigabit Ethernet (GbE) controllers onboard
- Two SATA channels with transfer rates up to 150MB/s onboard
- Six USB 2.0 devices onboard
- Integrated audio

1.2 NOVA-8522G2 Overview

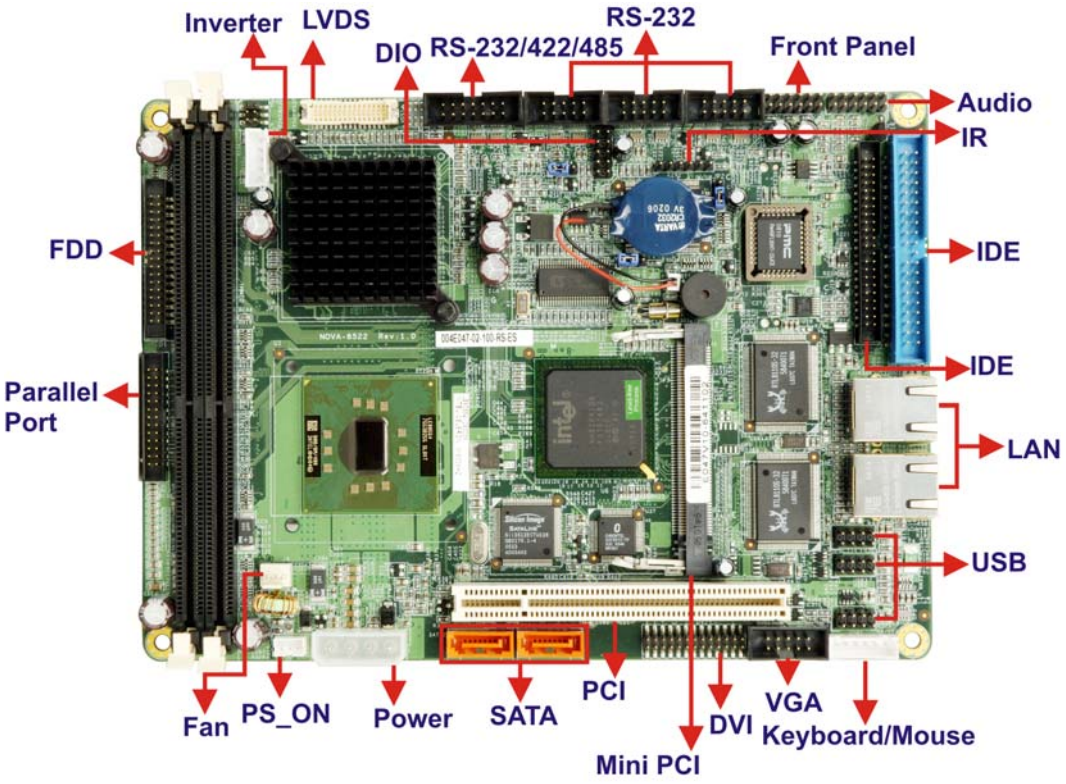

Figure 1-1: NOVA-8522G2 Overview

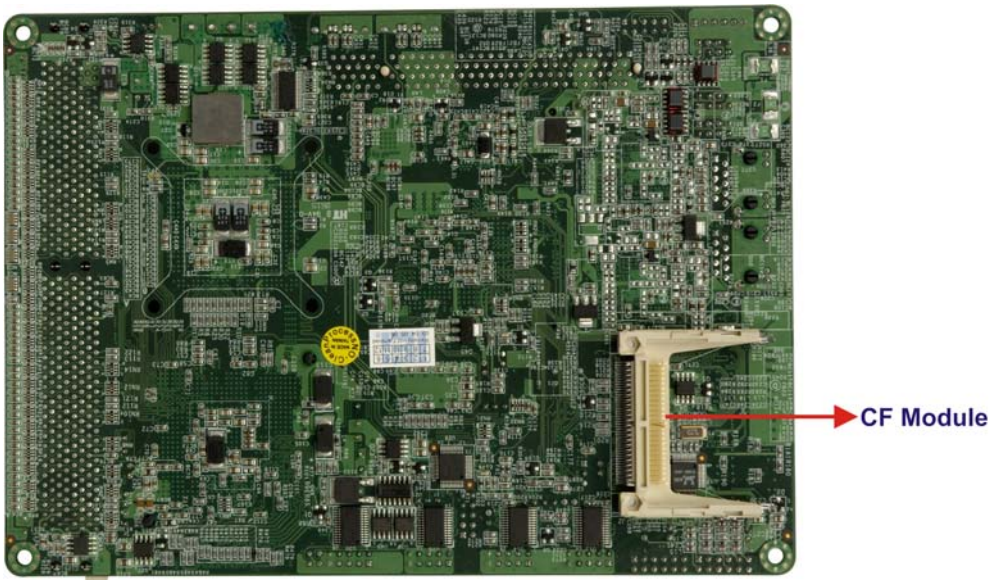

Figure 1-2: NOVA-8522G2 Solder Side Overview

1.2.1 NOVA-8522G2 Connectors

The NOVA-8522G2 has the following connectors onboard:

- 1 x Power connector
- 1 x PS_ON power connector
- 1 x Audio connector
- 1 x CompactFlash (CF) connector (solder side)
- 1 x Digital input/output connector
- 1 x DVI connector
- 1 x Fan connector
- 1 x Floppy disk connector
- 1 x Front panel connector
- 2 x IDE Interface connectors (40-pin and 44-pin)
- 1 x Inverter power connector
- 1 x IR interface connector
- 1 x Keyboard/mouse connector
- 1 x LCD LVDS interface connector
- 1 x PCI slot
- 1 x Parallel port connector
- 1 x RS-232/422/485 serial port connector
- 3 x RS-232 serial port connectors
- 2 x SATA connectors
- 3 x USB connectors
- 1 x VGA connector
- 2 x 184-pin DIMM sockets

The NOVA-8522G2 has the following connectors on the board rear panel:

- 2 x Ethernet connectors

The NOVA-8522G2 has the following onboard jumpers:

- Clear CMOS
- CF card setup

1.2.2 Technical Specifications

NOVA-8522G2 technical specifications are listed in **Table 1-2**. Detailed descriptions of each specification can be found in **Chapter 2 Detailed Specifications**.

Specification	NOVA-8522G2
Form Factor	5.25” form factor
CPU	Intel socket 479 Pentium M (up to 2.1 GHz) Intel socket 479 Celeron M (up to 1.7 GHz)
Northbridge Chipset	Intel 852GM
Southbridge Chipset	ICH4
Display	Intel Extreme Graphics 2 (integrated into Northbridge)
Memory	Supports two 1GB DDR266 184-pin DIMM modules
BIOS	AMI BIOS Label
SSD	CompactFlash (CF)
Super I/O	W83627HG
Audio	Realtek ALC655 AC'97 Codec
LAN	Dual RTL8110SC
COM	3 x RS-232C 1 x RS-232/422/485
USB2.0	3 x USB 1.1 or 2.0 onboard connectors support two devices each
IDE	1 x 40-pin IDE connects to two Ultra ATA33/66/100 devices 1 x 44-pin IDE connects to two Ultra ATA33/66/100 devices
Parallel Port	1 x LPT port connector
SATA	2 x SATA connectors with transfer rates up to 150MB/sec

KB/MS	PS/2 connector
WDT	Software programmable 1-255 sec. by super I/O
IrDA	SIR / ASKIR
Digital I/O	4 input / 4 output by super I/O
Fan connector	1x3 pin for CPU Fan
Expansion	1x mini PCI slot 1 x PCI slot
Power	+5V/+12V, AT/ATX support
Temperature	0ºC - 60ºC
Humidity	5%~95% non-condensing
Dimensions	146.05mm x 203.2mm
Weight (GW/NW)	1000g/400g

Table 1-2: Technical Specifications

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Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and onboard features of the NOVA-8522G2 in detail.

2.2 Board Dimensions

The dimensions of the board are listed below:

- **Length**: 203.2mm
- **Width**: 146.05mm

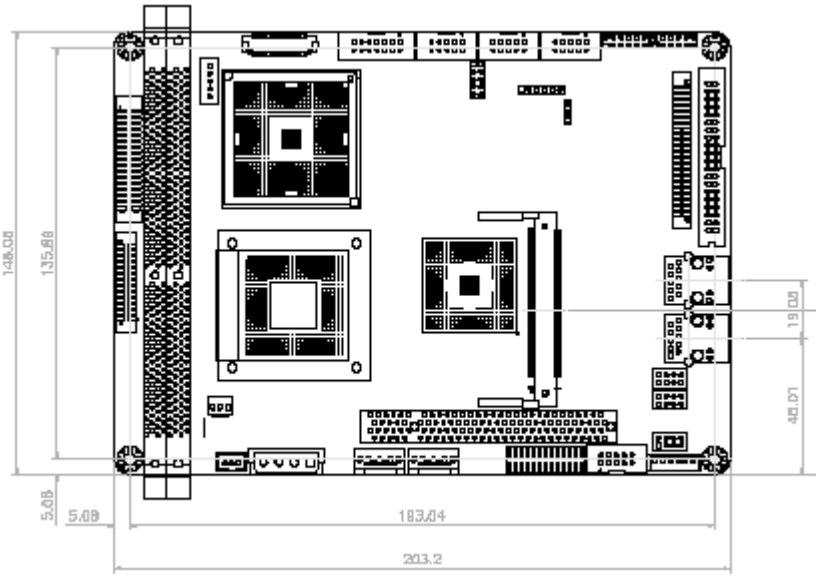

Figure 2-1: NOVA-8522G2 Dimension (mm)

2.2.1 CPU Support

NOTE:

The NOVA-8522G2-800Z-R10 and the NOVA-8522G2-800Z-DVI-R10 have a preinstalled zero cache Intel Celeron M 800MHz on board.

The NOVA-8522G2-1GZ-R10 and the NOVA-8522G2-1GZ-DVI-R10 have a preinstalled zero cache Intel Celeron M 1GMHz on board.

The NOVA-8522G2 supports normal voltage, low voltage (LV) and ultra low voltage (ULV) mobile (M) Intel® Pentium® M processors and Intel® Celeron® M processors

2.2.2 Supported Pentium® M CPUs

Table 2-1 lists the Intel® Pentium® M processors supported by the NOVA-8522G2 CPU board. All the Intel® Pentium® M processors support Enhanced Intel SpeedStep® Technology.

Processor Number	Power	Architecture	L2 Cache	Speed	FSB	Execute Disable Bit
778	LV	90nm	2MB	1.60GHz	400MHz	Yes
765	Normal	90nm	2MB	2.10GHz	400MHz	No
758	LV	90nm	2MB	1.50GHz	400MHz	Yes
755	Normal	90nm	2MB	2GHz	400MHz	No
753	ULV	90nm	2MB	1.20GHz	400MHz	Yes
745	Normal	90nm	2MB	1.80GHz	400MHz	No
738	LV	90nm	2MB	1.40GHz	400MHz	No
735	Normal	90nm	2MB	1.70GHz	400MHz	No
733J	ULV	90nm	2MB	1.10GHz	400MHz	Yes
733	ULV	90nm	2MB	1.10GHz	400MHz	No

725	ULV	90nm	2MB	1.60GHz	400MHz	No
723	ULV	90nm	2MB	1GHz	400MHz	No
718	LV	130nm	1MB	1.30GHz	400MHz	No

Table 2-1: Supported Pentium® M CPUs

2.2.3 Supported Celeron® M CPUs

Table 2-2 lists the Intel® Celeron® M processors supported by the NOVA-8522G2 CPU board.

Processor Number	Power	Architecture	L2 Cache	Speed	FSB	Execute Disable Bit
390	Normal	90nm	1MB	1.70GHz	400MHz	Yes
383	ULV	90nm	1MB	1GHz	400MHz	Yes
380	Normal	90nm	1MB	1.60GHz	400MHz	Yes
373	ULV	90nm	512KB	1GHz	400MHz	Yes
370	Normal	90nm	1MB	1.50GHz	400MHz	Yes
360J	Normal	90nm	1MB	1.40GHz	400MHz	Yes
360	Normal	90nm	1MB	1.40GHz	400MHz	No
353	ULV	90nm	512KB	900MHz	400MHz	No
350J	Normal	90nm	1MB	1.30GHz	400MHz	Yes
350	Normal	90nm	1MB	1.30GHz	400MHz	No
340	Normal	130nm	512KB	1.50GHz	400MHz	No
333	ULV	130nm	512KB	900MHz	400MHz	No
330	Normal	130nm	512KB	1.40GHz	400MHz	No
320	Normal	130nm	512KB	1.30GHz	400MHz	No
310	Normal	130nm	512KB	1.20GHz	400MHz	No

Table 2-2: Supported Celeron® M CPUs

2.3 Onboard Chipsets

2.3.1 Northbridge and Southbridge Chipsets

The following chipsets are preinstalled on the board:

- **Northbridge**: Intel® 852GM
- **Southbridge**: Intel® ICH4

The following two sections (**Section 2.3.2** and **Section 2.3.3**) list some of the features of the Intel® 852GM and the Intel® ICH4 chipsets. For more information on these two chipsets please refer to the Intel website.

2.3.2 Intel® 852GM Northbridge Chipset

The Intel 852GM northbridge chipset comes with the following features:

- The Intel 852GM chipset is designed, validated, and optimized for the Mobile Intel Celeron processor and Intel Celeron processor with Intel® NetBurst® micro-architecture
- 400 MHz system bus delivers a high-bandwidth connection between the processor and the platform
- Supports integrated graphics utilizing Intel® Extreme Graphics 2 technology
- Advanced packaging technology and industry leading electrical design innovations deliver long-term system reliability over wide operating conditions
- Three USB host controllers provide high performance peripherals with 480 Mbps of bandwidth, while enabling support for up to six USB 2.0 ports.
- The on-chip AC ’97 implementation delivers 20-bit audio for enhanced sound quality and full surround-sound capability.
- LAN Connect Interface (LCI) provides flexible network solutions such as 10/100 Mbps Ethernet and 10/100 Mbps Ethernet with LAN manageability
- Dual Ultra ATA/100 controllers, coupled with the Intel® Application Accelerator – a performance software package – support faster IDE transfers to storage devices
- Intel Application Accelerator software provides additional performance over native ATA drivers by improving I/O transfer rates and enabling faster O/S load time, resulting in accelerated boot times

- Communication and Network Riser (CNR) offers flexibility in system configuration with a baseline feature set that can be upgraded with an audio card, modem card, or network card
- Embedded lifecycle support
- Integrated graphics

2.3.3 Intel® ICH4 Southbridge Chipset

The ICH4 southbridge chipset comes with the following features, functions and capabilities:

- PCI Local Bus Specification, Revision 2.2-compliant with support for 33 MHz PCI operations.
- PCI slots (supports up to 6 Req/Gnt pairs)
- ACPI Power Management Logic Support
- Enhanced DMA controller, Interrupt controller, and timer functions
- Integrated IDE controller supports Ultra ATA100/66/33
- USB host interface with support for 6 USB ports; 3 UHCI host controllers; 1 EHCI high-speed USB 2.0 Host controller
- Integrated LAN controller
- System Management Bus (SMBus) Specification, Version 2.0 with additional support for I^2C devices
- Supports Audio Codec ’97, Revision 2.3 specification (a.k.a., AC ’97 Component Specification, Revision 2.3) Link for Audio and Telephony codecs (up to seven channels)
- Low Pin Count (LPC) interface
- Firmware Hub (FWH) interface support
- Alert On LAN* (AOL) and Alert On LAN 2* (AOL2)

2.4 Data Flow

Figure 2-2 shows the data flow between the two onboard chipsets and other components installed on the motherboard and described in the following sections of this chapter.

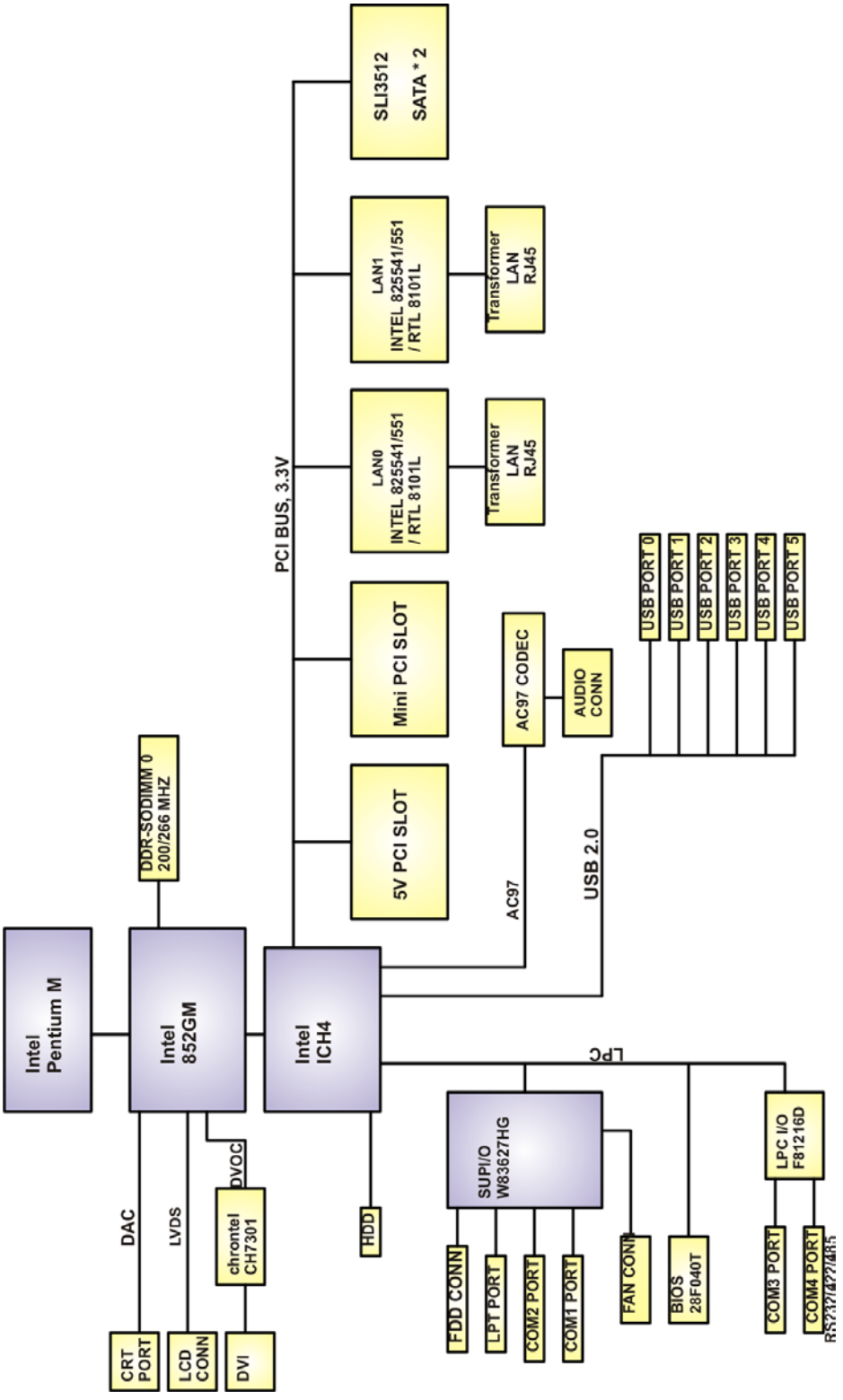

Figure 2-2: Data Flow Block Diagram

2.5 Graphics Support

Features of the Intel Extreme Graphics 2 technology integrated on the Intel 852GM northbridge chipset are listed below.

- **Enhanced 2D 256-bit internal path**:
  - 8/16/32bpp
  - DirectDraw*, GDI, GDI+
  - Anti-aliased text support
  - Alpha blending
  - Alphas stretch blitter
  - Hardware alpha blended RGB cursor
  - Color space conversion
  - 5x2 overlay support
  - Rotate, scale and translate operations
- **High-performance 3D 256-bit internal path**:
  - 32bpp/ 24ZorW/ 8 Stencil
  - DX7*/DX8*/OGL*1.1
  - DXTn texture compression
  - Up to 4 textures / pixel on a single pass
  - Cubic reflection map
  - Embossed/DOT3 bump mapping
  - Multi-texture
  - DOT3 bump-mapping
  - Point sprites
- **Video and Display DirectShow*/DirectVA***:
  - Hardware motion compensation support for DVD playback
  - 4x2 overlay filter
  - 350 MHz DAC frequency
  - Maximum DVO pixel rate of up to 330MP/s
  - Flat panel monitors and TV-out support via AGP Digital Display (ADD) cards
  - 350 MHz DAC for 1800x1440 @ 85Hz max CRT resolution or 2048x1536@60Hz max FP resolution
  - Synchronous display for dual monitor capabilities
  - 350MHz RAMDAC for up to QXGA analog monitor support

- Dual DVO ports for up to QXGA digital display support
- Multiple display types (LVDS, DVI, TV-out, CRT)

2.6 Memory Support

The NOVA-8522G2 has two 184-pin dual inline memory module (DIMM) sockets and supports up to two un-buffered DDR DIMMs with the following specifications:

- **Maximum RAM**: 2GB (1GB module in each slot)
- **DIMM Transfer Rates**: 266MHz

2.7 PCI Bus Interface Support

The PCI bus on the NOVA-8522G2 has the following features:

- 33MHz Revision 2.2 is implemented
- Maximum throughput: 133MB/sec
- One PCI REQ/GNT pair can be given higher arbitration priority (intended for external 1394 host controller)

2.8 GbE Ethernet

The NOVA-855G2 has two RTL8110SC GbE Ethernet controllers onboard. The technical features of these controllers are listed below.

- Integrated 10/100/1000 transceiver
- Auto-Negotiation with Next page capability
- Supports PCI 2.3, 32bit, 33/66MHz
- Supports pair swap/polarity/skew correction
- Crossover Detection & Auto-Correction
- Wake-on-LAN and remote wake-up support
- Microsoft® NDIS5 Checksum Offload (IP, TCP, UDP) and largesend offload support
- Supports Full Duplex flow control (IEEE 802.3x)
- Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
- Supports IEEE 802.1Q VLAN tagging
- Serial EEPROM
- 3.3V signaling, 5V PCI I/O tolerant

- Transmit/Receive FIFO (8K/64K) support
- Supports power down/link down power saving

2.9 Drive Interfaces

The NOVA-8522G2 can support the following drive interfaces.

- 2 x SATA drives
- 4 x IDE devices
- 1 x FDD
- 1 x CFII card

2.9.1 SATA Drives

The NOVA-8522G2 supports two, first generation SATA drives with transfer rates of up to 150MB/s

2.9.2 IDE HDD Interfaces

The NOVA-8522G2 southbridge chipset IDE controller supports up to two HDDs with the following specifications:

- Supports PIO IDE transfers up to 16MB/s
- Supports the following Ultra ATA devices:
  - **Ultra ATA/100**, with data transfer rates up to 100MB/s
  - **Ultra ATA/66**, with data transfer rates up to 66MB/s
  - **Ultra ATA/33**, with data transfer rates up to 33MB/s

2.9.3 Floppy Disk Drive (FDD)

The NOVA-8522G2 supports a single FDD. The following FDD formats are compatible with the board.

- 5.25”: 360KB and 1.2MB
- 3.5”: 720KB, 1.44MB and 2.88MB

2.9.4 CompactFlash Support

Standard CFII cards can be inserted into the CompactFlash slot on the solder side of the NOVA-8522G2 PCB.

2.10 Serial Ports

The NOVA-8522G2 has four high-speed UART serial ports, configured as COM1, COM2, COM3 and COM4. The serial ports have the following specifications.

- 16C550 UART with 16-byte FIFO buffer
- 115.2Kbps transmission rate

COM4 can be configured as RS-232, RS-422 or RS-485. COM2 can also be configured as an infrared interface.

2.11 Real Time Clock

256-byte battery backed CMOS RAM

2.12 System Monitoring

The NOVA-8522G2 is capable of self-monitoring various aspects of its operating status including:

- CPU, chipset, and battery voltage, +3.3V, +5V, and +12V
- RPM of cooling fans
- CPU and board temperatures (by the corresponding embedded sensors)

2.13 Infrared Data Association (IrDA) Interface

The NOVA-8522G2 IrDA supports the following interfaces.

- Serial Infrared (SIR)
- Shift Keyed Infrared (ASKIR)

If an IrDA port is need, COM2 must be configured as either SIR or ASKIR mode in the BIOS under **Super IO devices**. Normal RS-232 COM 2 is then disabled.

2.14 USB Interfaces

The NOVA-8522G2 has six USB interfaces support USB 2.0.

2.15 BIOS

The NOVA-8522G2 uses a licensed copy of AMI BIOS. The features of the flash BIOS used are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (**P**re-Boot E**x**ecution **E**nvironment) support
- USB booting support

2.16 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the NOVA-8522G2 are listed below.

- Minimum Operating Temperature: 0ºC (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the northbridge and southbridge chipsets to ensure the operating temperature of these chips remain low.

2.17 Audio Codec

The NOVA-8522G2 has an integrated REALTEK ALC655 CODEC. The ALC655 CODEC is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC designed for PC multimedia systems, including host/soft audio and AMR/CNR-based designs. Some of the features of the codec are listed below.

- Meets performance requirements for audio on PC99/2001 systems
- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 16-bit Stereo full-duplex CODEC with 48KHz sampling rate
- Compliant with AC'97 Rev 2.3 specifications

- Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing
- 14.318MHz -> 24.576MHz PLL to eliminate crystal
- 12.288MHz BITCLK input
- Integrated PCBEEP generator to save buzzer
- Interrupt capability
- Three analog line-level stereo inputs with 5-bit volume control, LINE_IN, CD, AUX
- High-quality differential CD input
- Two analog line-level mono inputs: PCBEEP, PHONE-IN
- Two software selectable MIC inputs
- Dedicated Front-MIC input for front panel applications (software selectable)
- Boost preamplifier for MIC input
- LINE input shared with surround output; MIC input shared with Center and LFE output
- Built-in 50mW/20ohm amplifier for both Front-out and Surround-Out
- External Amplifier Power Down (EAPD) capability
- Power management and enhanced power saving features
- Supports Power-Off CD function
- Adjustable VREFOUT control
- Supports 48KHz S/PDIF output, complying with AC'97 Rev 2.3 specifications
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-pin LQFP package
- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- I3DL2 compatible
- HRTF 3D positional audio
- 10-band software equalizer
- Voice cancellation and key shifting in Karaoke mode
- AVRack® Media Player
- Configuration Panel for improved user convenience

2.18 Power Consumption

Table 2-3 shows the power consumption parameters for the NOVA-8522G2 when a Celeron M processor with a clock speed of 1.6GHz and a FSB 400MHz is running with two 512MB DDR266 modules. (under WinXP, 3D Mark 2003)

Voltage	Current
+5V	4.10A
+12V	2.36A

Table 2-3: Power Consumption

2.19 Packaged Contents and Optional Accessory Items

2.19.1 Package Contents

The NOVA-8522G2 is shipped with the following components.

- 1x NOVA-8522G2 single board computer
- 1 x IDE flat cable 40P/40P/40P
- 1 x 2.54 pitch KB/PS2 mouse cable
- 2 x SATA cable
- 1 x SATA power cable
- 1 x audio cable
- 1 x VGA cable
- 3 x 2.54 pitch RS-232 cables (without brackets)
- 1 x RS-232/422/485 cable (without bracket)
- 1x 2.54 pitch USB cable (without bracket)
- 1 x Mini jumper pack
- 1x Utility CD
- 1x Quick Installation Guide

2.19.2 Optional Accessory Items

The items shown in the list below are optional accessory items are purchased separately.

- CPU cooler
- FDD cable
- LPT cable
- ATX power cable

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Chapter

3

Connectors and Jumpers

3.1 Peripheral Interface Connectors

Section 3.1.1 shows peripheral interface connector locations. Section 3.1.2 lists all the peripheral interface connectors seen in Section 3.1.1.

3.1.1 NOVA-8522G2 Layout

Figure 3-1 shows the onboard peripheral connectors, rear panel peripheral connectors and onboard jumpers.

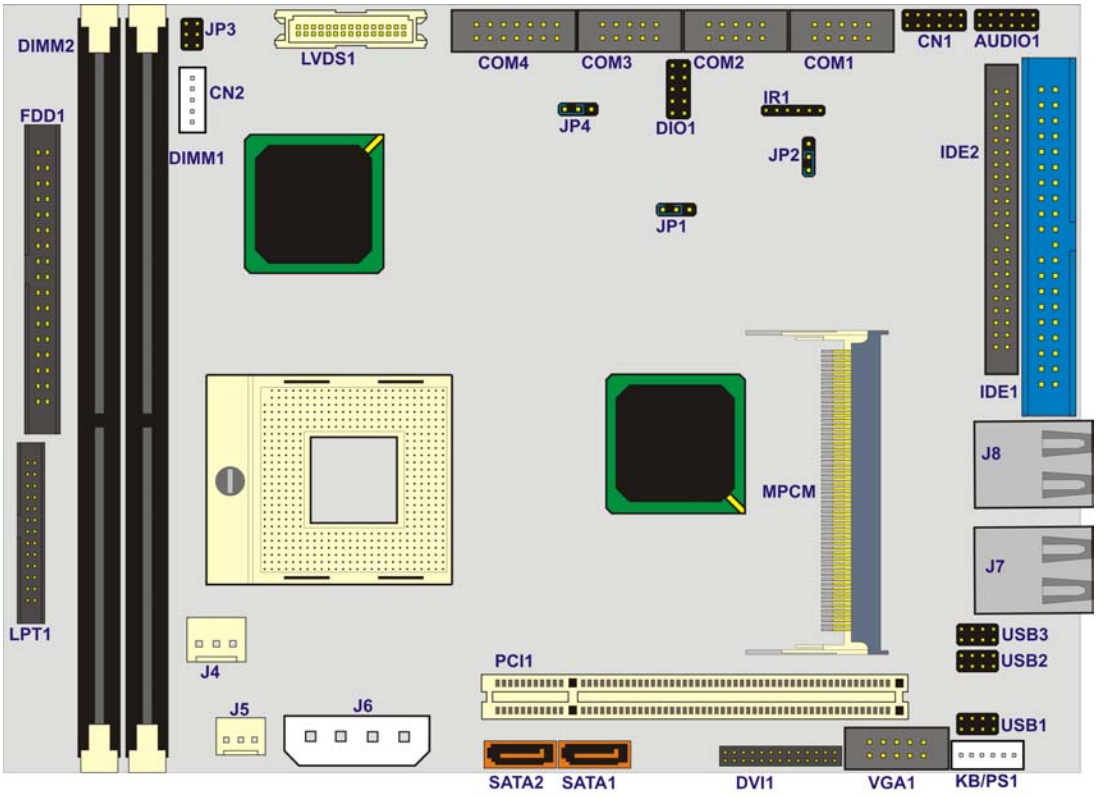


Figure 3-1: Connector and Jumper Locations

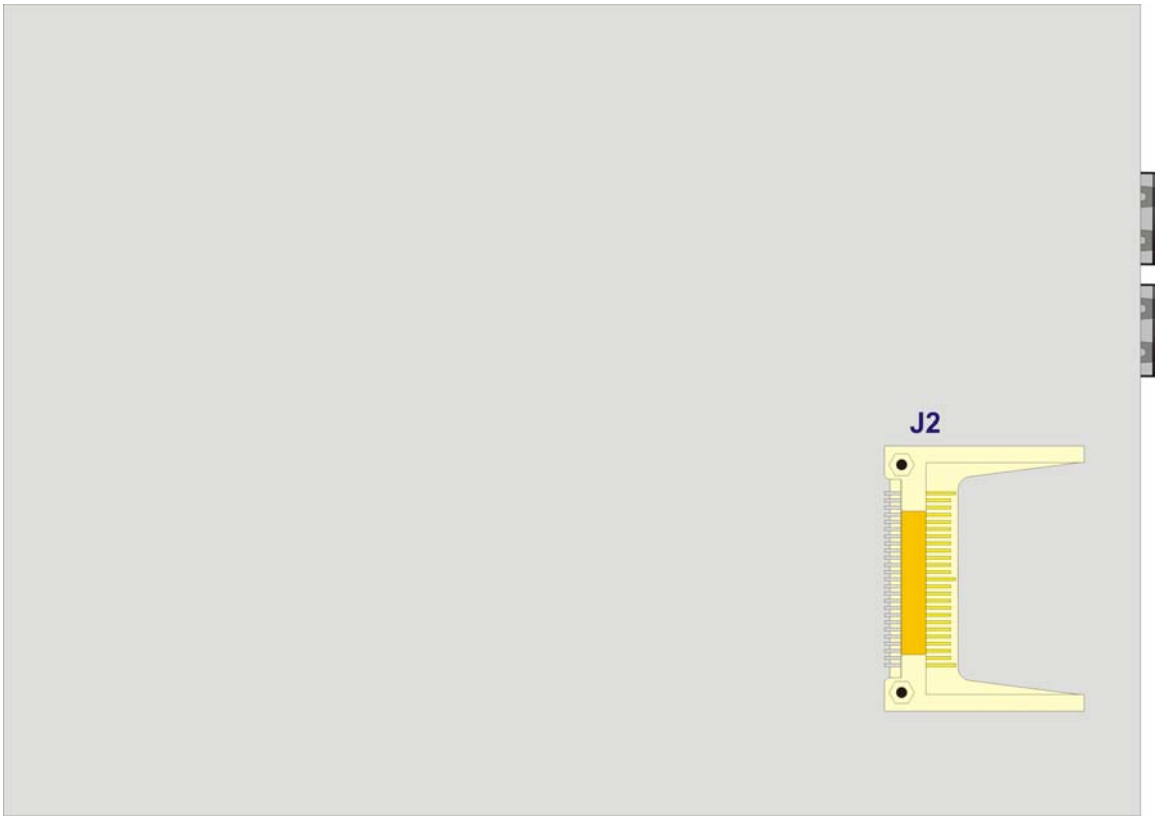


Figure 3-2: Connector and Jumper Locations (Solder Side)

3.1.2 Peripheral Interface Connectors

Table 3-1 shows a list of the peripheral interface connectors on the NOVA-8522G2. Detailed descriptions of these connectors can be found in **Section 3.2** on **page 43**.

Connector	Type	Label
Power connector	4-pin header	J6
PS_ON connector	3-pin header	J5
Audio connector	12-pin header	AUDIO1
CompactFlash (CF) connector	50-pin header	J2
Digital Input/Output Connector	10-pin header	DIO1
Digital video interface (DVI) connector	26-pin header	DVI1

Fan connector	3-pin header	J4
Floppy Disk connector	34-pin header	FDD1
Front Panel connector	12-pin header	CN1
IDE Interface connector (Primary)	40-pin header	IDE1
IDE Interface connector (Secondary)	44-pin header	IDE2
Inverter Power connector	5-pin header	CN2
IR Interface connector	5-pin header	IR1
Keyboard/Mouse connector	6-pin header	KB/PS1
LVDS interface connector	30-pin header	LVDS1
Parallel port connector	26-pin header	LPT1
PCI slot	120-pin PCI slot	PCI1
Mini PCI connector	124-pin connector	MPCI1
RS-232 serial port connector	10-pin header	COM1
RS-232 serial port connector	10-pin header	COM2
RS-232 serial port connector	10-pin header	COM3
RS-232/422/485 serial port connector	14-pin header	COM4
SATA drive connector (150MB/s)	7-pin SATA connector	SATA1
SATA drive connector (150MB/s)	7-pin SATA connector	SATA2
USB connector (USB 1.1 and USB 2.0)	8-pin header	USB1
USB connector (USB 1.1 and USB 2.0)	8-pin header	USB2
USB connector (USB 1.1 and USB 2.0)	8-pin header	USB3
VGA connector	10-pin header	VGA1

Table 3-1: Peripheral Interface Connectors

3.1.3 Rear Panel Connectors

Table 3-2 lists the rear panel connectors on the NOVA-8522G2. Detailed descriptions of these connectors can be found in Section 3.3 on page 71.

Connector	Type	Label
Ethernet connector	RJ-45	J7
Ethernet connector	RJ-45	J8

Table 3-2: Rear Panel Connectors

3.1.4 Onboard Jumpers

Table 3-3 lists the onboard jumpers. Detailed descriptions of these jumpers can be found in **Section 3.3.1** on page 71.

Description	Label	Type
Clear CMOS	JP1	3-pin header
CF card setup	JP2	3-pin header
LCD LVDS voltage setup	JP3	6-pin header
COM4 setup (RS-232/485)	JP4	3-pin header

Table 3-3: Onboard Jumpers

3.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the NOVA-8522G2.

3.2.1 Power Connector

CN Label: **J6**

CN Type: 4-pin power connector (1x4)

CN Location: See **Figure 3-3**

CN Pinouts: See **Table 3-4**

The Power connector is connected to an AT power source that powers the system.

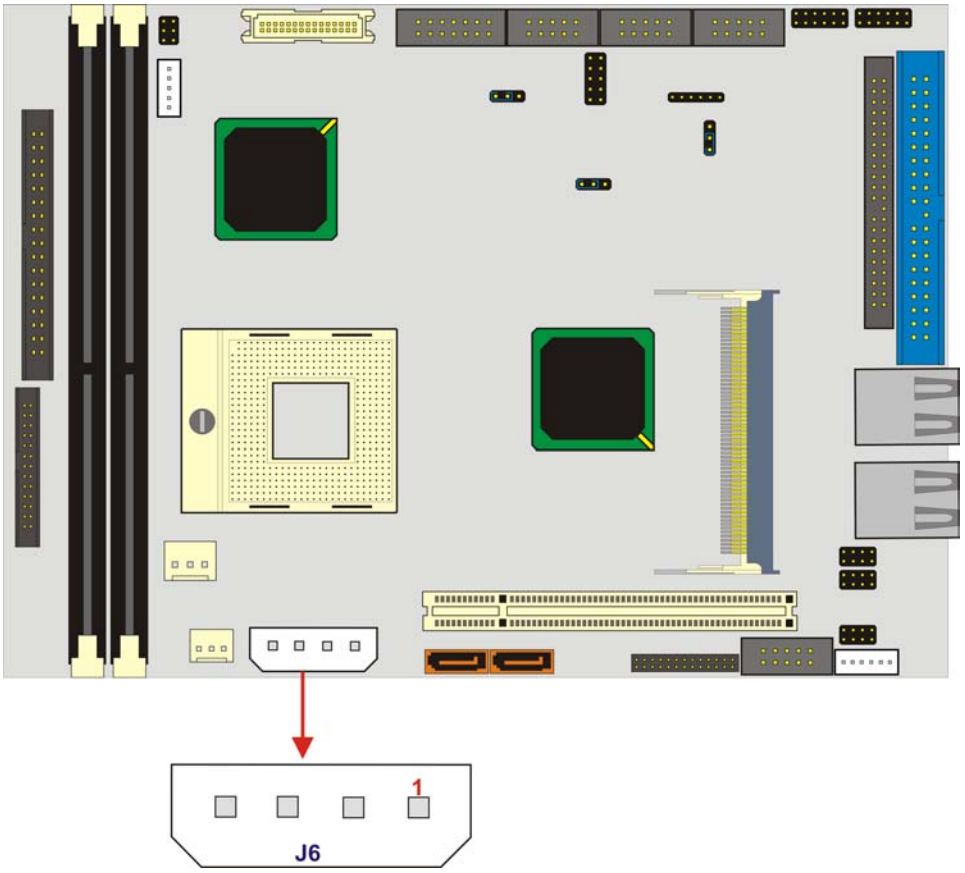


Figure 3-3: Power Connector Location

PIN NO.	DESCRIPTION
1	+5V
2	GND
3	GND
4	+12V

Table 3-4: Power Connector Pinouts

3.2.2 ATX PS_ON Connector

CN Label: **J5**

CN Type: 3-pin header (1x3)

CN Location: See **Figure 3-4**

CN Pinouts: See **Table 3-5**

The ATX PS_ON connector (J5) connects to an ATX power supply.

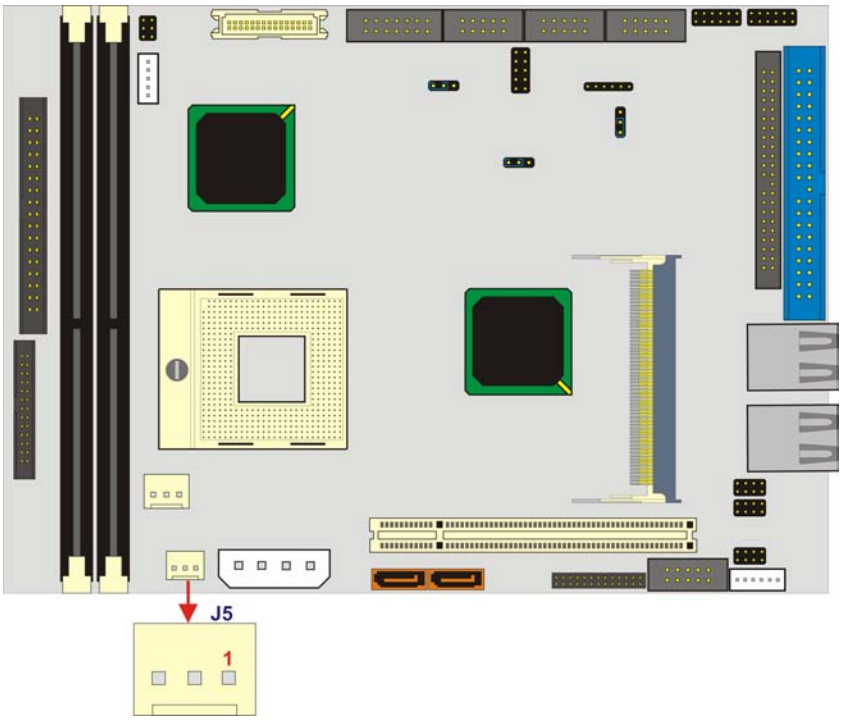


Figure 3-4: ATX PS_ON Connector Location

PIN NO.	DESCRIPTION
1	+5V_SB
2	GROUND
3	PS_ON

Table 3-5: ATX PS_ON Connector Pinouts

3.2.3 Audio Connector

CN Label: **AUDIO1**

CN Type: 12-pin header (2x6)

CN Location: See **Figure 3-5**

CN Pinouts: See **Table 3-6**

The audio connector is connected to an onboard codec. An external audio connector kit can be connected to the connector to provide sound input and output.

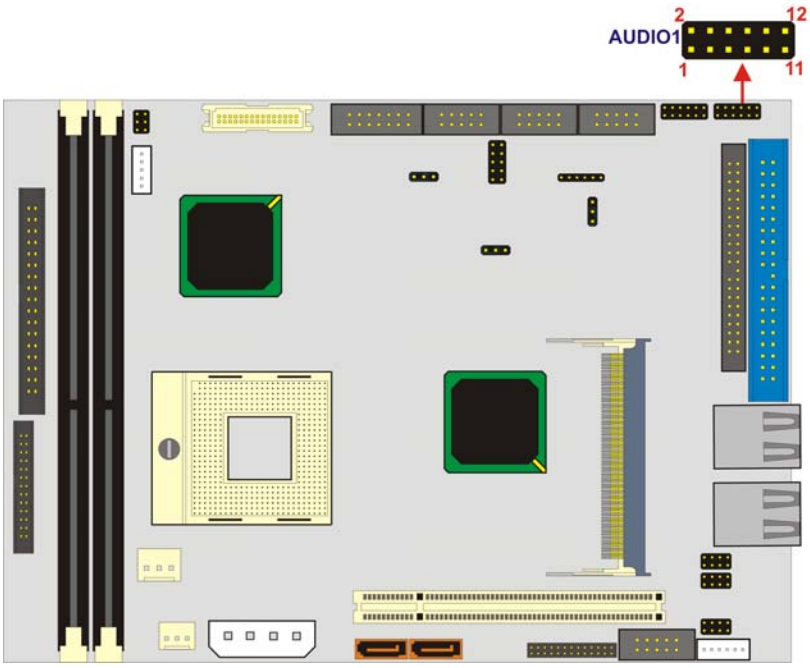


Figure 3-5: Audio Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Left Speaker Out	2	Right Speaker Out
3	GND	4	GND
5	Line Out Left	6	Line Out Right
7	Line In Left	8	Line In Right
9	GND	10	GND
11	MIC IN	12	GND

Table 3-6: Audio Connector Pinouts

3.2.4 CompactFlash Connector

CN Label: **J2** (solder side)

CN Type: 50-pin header (2x25)

CN Location: See **Figure 3-6**

CN Pinouts: See **Table 3-7**

A CompactFlash memory module is inserted to the CompactFlash 2 connector (J2). Jumper 2 (JP2) configures the CompactFlash drive as either a slave or master device.

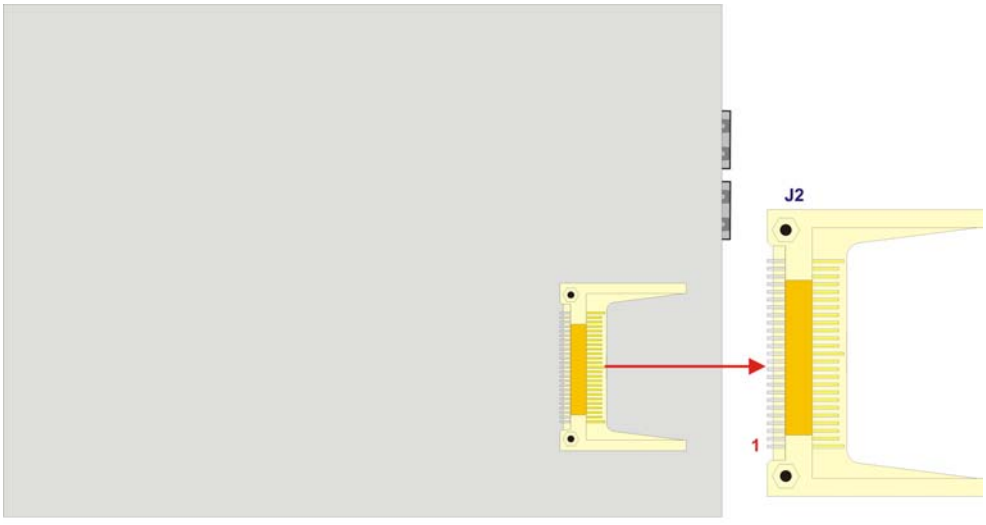


Figure 3-6: CompactFlash Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	SDCS#1	32	SDCS#3
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC_COM
12	N/C	37	IRQ15
13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#
20	SA0	45	HDD_ACTIVE#
21	DATA 0	46	66DET
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	VCC-IN CHECK2	50	GROUND

Table 3-7: CompactFlash Connector Pinouts

3.2.5 Digital Input/Output (DIO) Connector

CN Label: **DIO1**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 3-7**

CN Pinouts: See **Table 3-8**

The DIO connector is managed through a Super I/O chip. The DIO connector pins are user programmable.

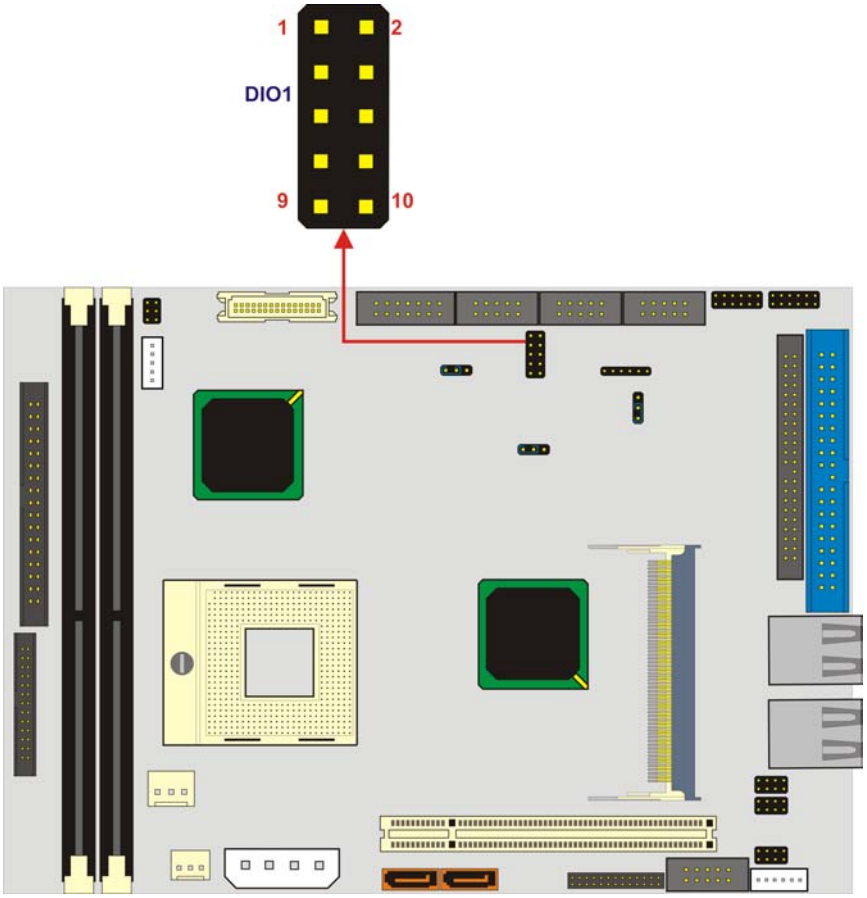


Figure 3-7: DIO Connector Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 0	4	Output 1
5	Output 2	6	Output 3
7	Input 0	8	Input 1
9	Input 2	10	Input 3

Table 3-8: DIO Connector Connector Pinouts

3.2.6 Digital Visual Interface (DVI) Connector

CN Label: **DVI1**

CN Type: 26-pin header (2x13)

CN Location: See **Figure 3-8**

CN Pinouts: See **Table 3-9**

The DVI connector converts analog signals into digital signals and provides connectivity to both analog and digital monitors.

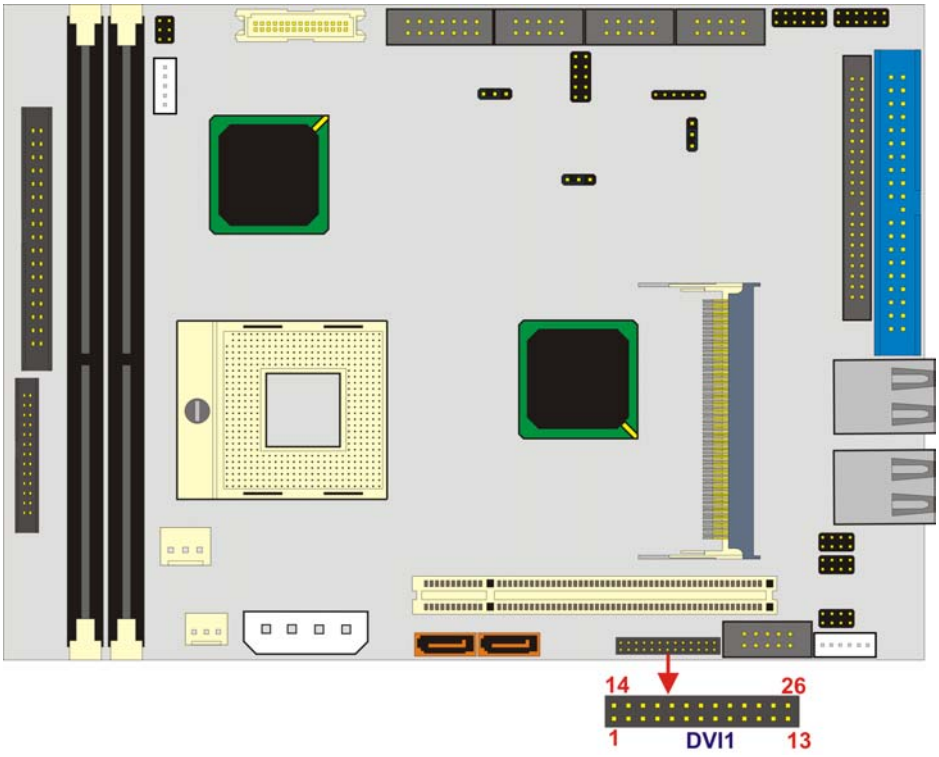


Figure 3-8: DVI Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DATA2-	14	+5V
2	DATA2+	15	GND
3	GND	16	HPDET
4	NC	17	DATA0-
5	NC	18	DATA0+

6	DDCCLK	19	GND
7	DDCDATA	20	NC
8	NC	21	NC
9	DATA1-	22	GND
10	DATA1+	23	CLK+
11	GND	24	CLK-
12	NC	25	GND
13	NC	26	NC

Table 3-9: DVI Connector Connector Pinouts

3.2.7 Fan Connector

CN Label: **J4**

CN Type: 3-pin header

CN Location: See **Figure 3-9**

CN Pinouts: See **Table 3-10**

The cooling fan connector provides a 12V, 500mA current to a system cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

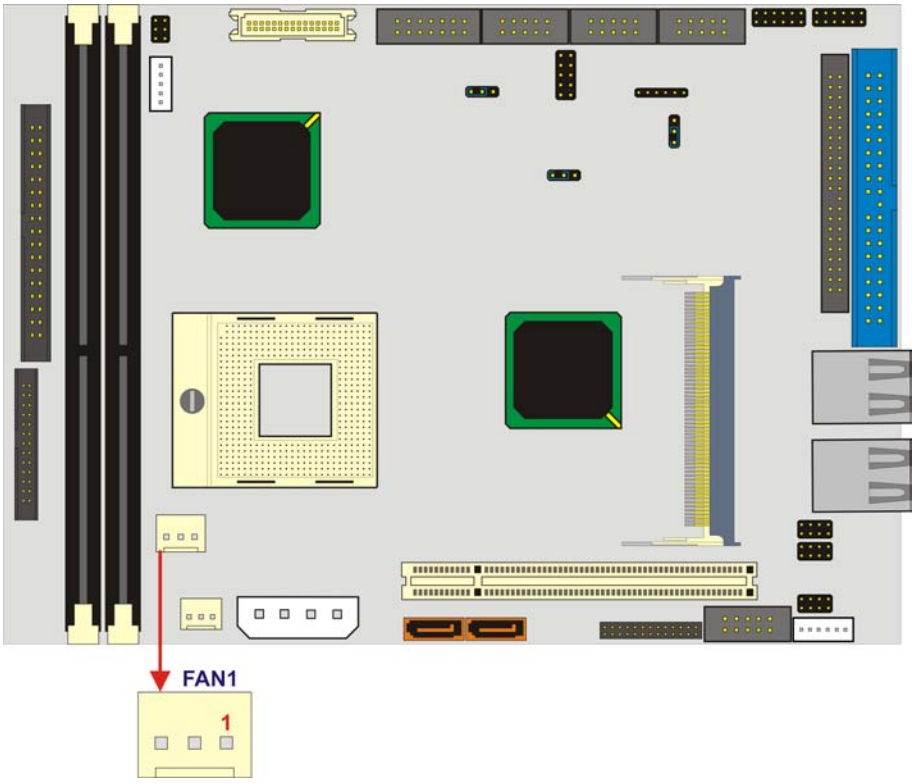


Figure 3-9: Fan Connector Location

PIN NO.	DESCRIPTION
1	Fan Speed Detect
2	+12V
3	GND

Table 3-10: Fan Connector Pinouts

3.2.8 Floppy Disk Connector

CN Label: **FDD1**

CN Type: 34-pin header (2x17)

CN Location: See **Figure 3-10**

CN Pinouts: See **Table 3-11**

The floppy disk connector (FDD1) is connected to a floppy disk drive.

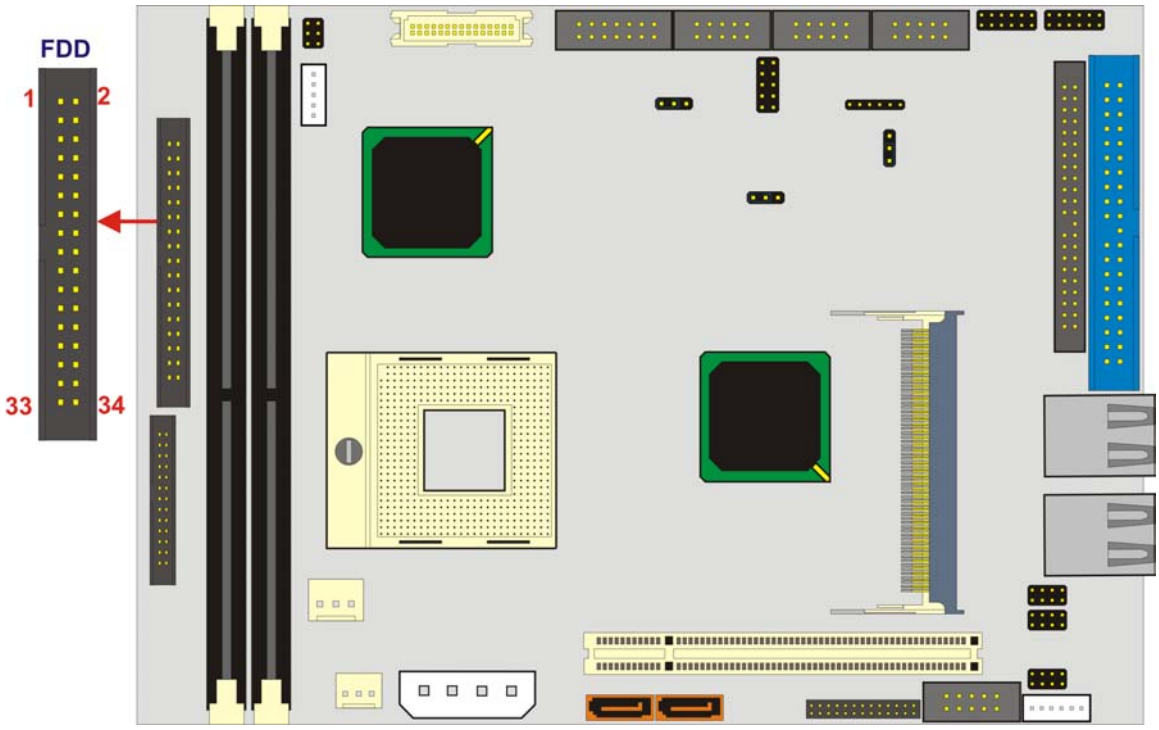


Figure 3-10: FDD Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	DRVDEN0
3	GND	4	N/C
5	N/C	6	DRVDEN1
7	GND	8	INDEX#
9	GND	10	MOTOR ENABLE A#
11	GND	12	DRIVE SELECT B#
13	GND	14	DRIVE SELECT A#
15	GND	16	MOTOR ENABLE B#
17	GND	18	DIRECTION#
19	GND	20	STEP#
21	GND	22	WRITE DATA#
23	GND	24	WRITE GATE#
25	GND	26	TRACK 0#
27	GND	28	WRITE PROTECT#
29	GND	30	READ DATA#
31	GND	32	SIDE 1 SELECT#

33	GND	34	DISK CHANGE#

Table 3-11: FDD Connector Pinouts

3.2.9 Front Panel Connector

CN Label: **CN1**

CN Type: 12-pin header (2x6)

CN Location: See **Figure 3-11**

CN Pinouts: See **Table 3-12**

The front panel connector (CN1) connects to several external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- Power button
- Reset button
- Speaker
- Power LED
- HDD LED

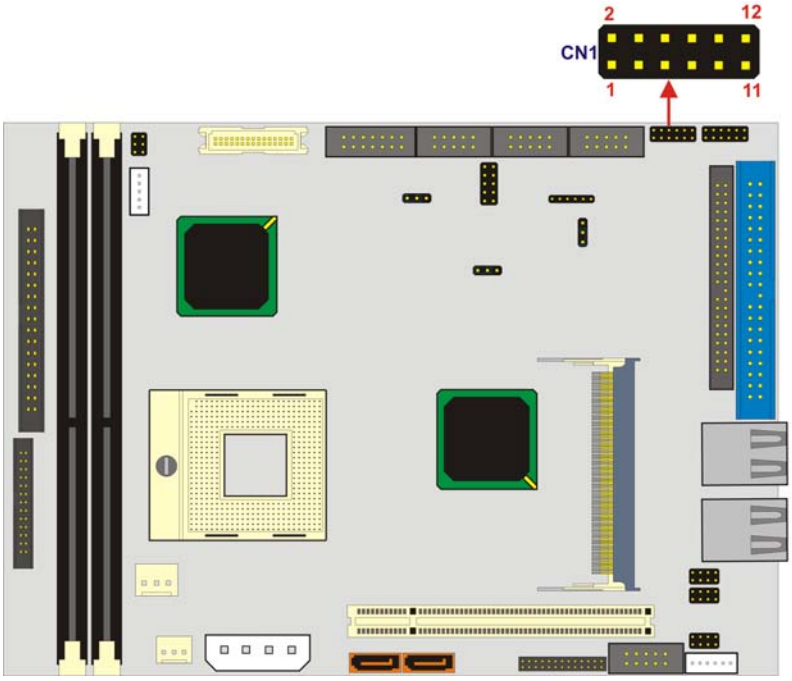


Figure 3-11: Front Panel Connector Locations

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	LED+	Buzzer	2	BUZZER-
	3	LED-		4	NC
Power Button	5	BUTTON1		6	NC
	7	BUTTON2		8	VCC
HDD LED	9	HDD LED+	Reset	10	RESET
	11	HDD LED-		12	GND

Table 3-12: Front Panel Connector Pinouts

3.2.10 IDE Connector (Primary)

CN Label: **IDE1**

CN Type: 40-pin header (2x20)

CN Location: See **Figure 3-12**

CN Pinouts: See **Table 3-13**

One primary 40-pin primary IDE device connector on the NOVA-8522G2 motherboard supports connectivity to Ultra ATA/33/66/100 IDE devices with data transfer rates up to 100MB/s.

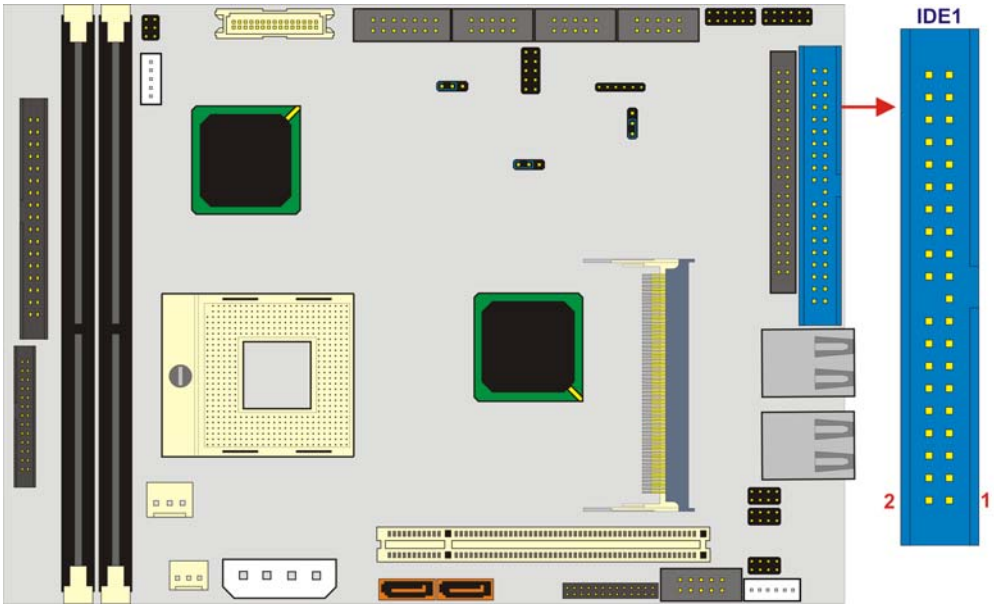


Figure 3-12: Primary IDE Device Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND–DEFAULT
29	IDE DACK	30	GROUND
31	INTERRUPT	32	N/C
33	SA1	34	P66DET
35	SA0	36	SA2

37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

Table 3-13: Primary IDE Connector Pinouts

3.2.11 IDE Connector (Secondary)

CN Label: **IDE2**

CN Type: 44pin header (2x22)

CN Location: See **Figure 3-13**

CN Pinouts: See **Table 3-14**

One 44-pin secondary IDE device connector on the NOVA-8522G2 motherboard supports connectivity to Ultra ATA/33/66/100 IDE devices with data transfer rates up to 100MB/s.

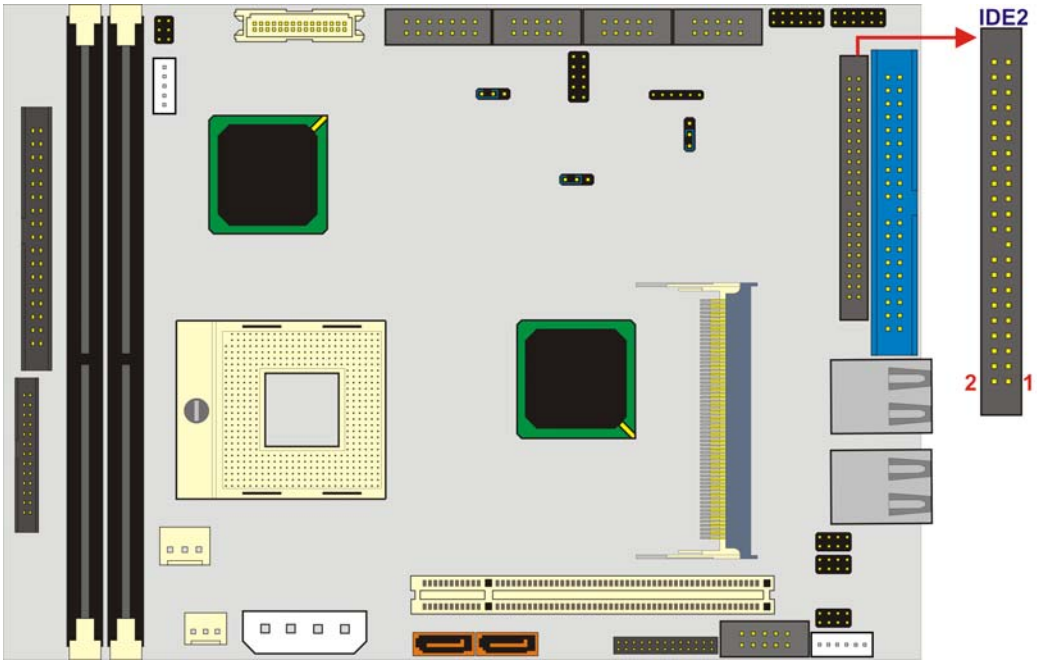


Figure 3-13: Secondary IDE Device Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8

5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND-DEFAULT
29	IDE DACK	30	GROUND
31	INTERRUPT	32	N/C
33	SA1	34	S66DET
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND
41	VCC	42	VCC
43	GROUND	44	N/C

Table 3-14: Secondary IDE Connector Pinouts

3.2.12 Inverter Power Connector

CN Label: **CN2**

CN Type: 5-pin header (1x5)

CN Location: See **Figure 3-14**

CN Pinouts: See **Table 3-15**

The inverter connector is connected to the LCD backlight.

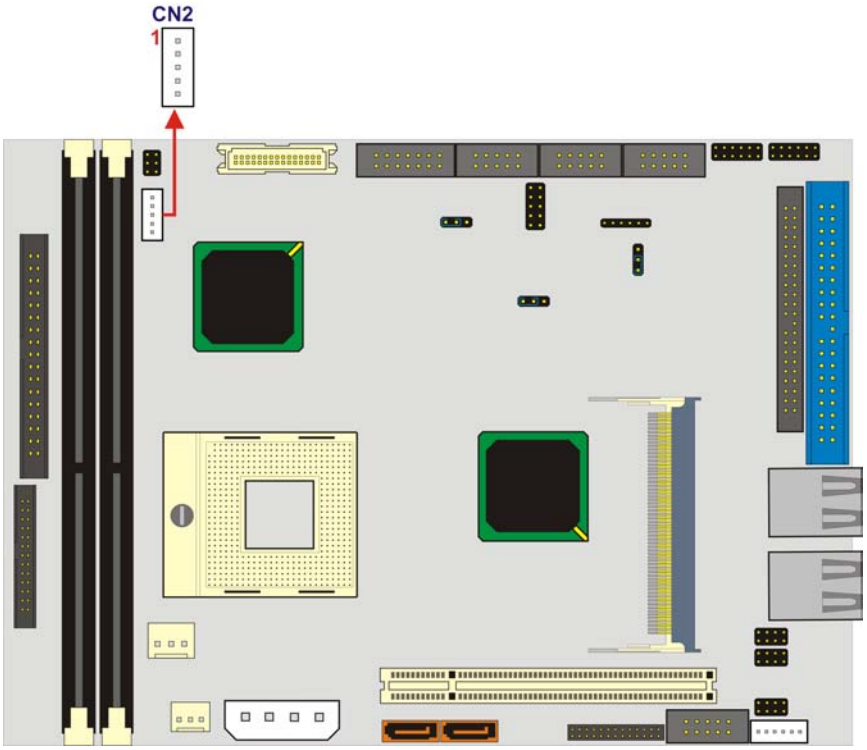


Figure 3-14: Inverter Connector Locations

PIN NO.	DESCRIPTION
1	NC
2	GND
3	BKL_POWER (+12V)
4	GND
5	+5V

Table 3-15: Inverter Power Connector Pinouts

3.2.13 IR Interface Connector

CN Label: **IR1**

CN Type: 6-pin header (1x6)

CN Location: See **Figure 3-15**

CN Pinouts: See **Table 3-16**

The integrated infrared (IrDA) connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.

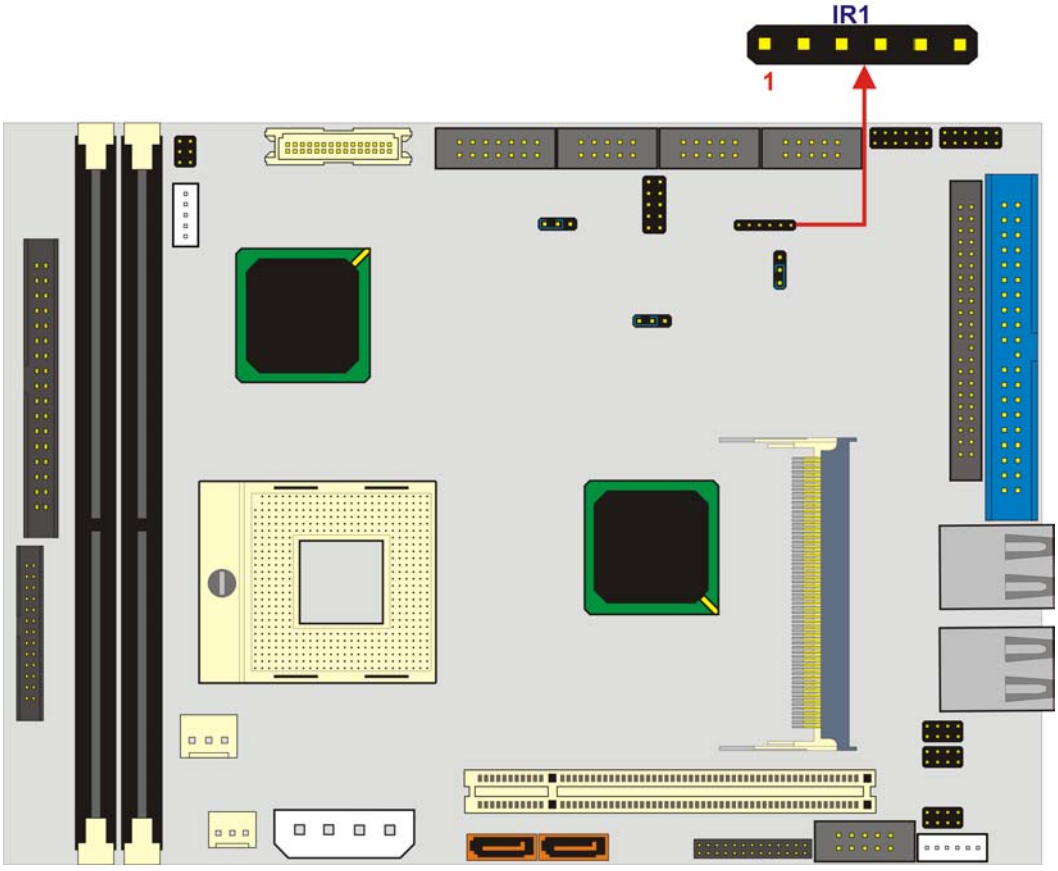


Figure 3-15: IR Connector Pinout Locations

PIN NO.	DESCRIPTION
1	5V
2	NC
3	IRRX
4	GND
5	IRTX
6	CIRRX

Table 3-16: IR Connector Pinouts

3.2.14 Keyboard/Mouse Connector

CN Label: **KB/PS1**

CN Type: 6-pin header (1x6)

CN Location: See **Figure 3-16**

CN Pinouts: See **Table 3-17**

The keyboard and mouse connector can be connected to a standard PS/2 cable or PS/2 Y-cable to add keyboard and mouse functionality to the system.

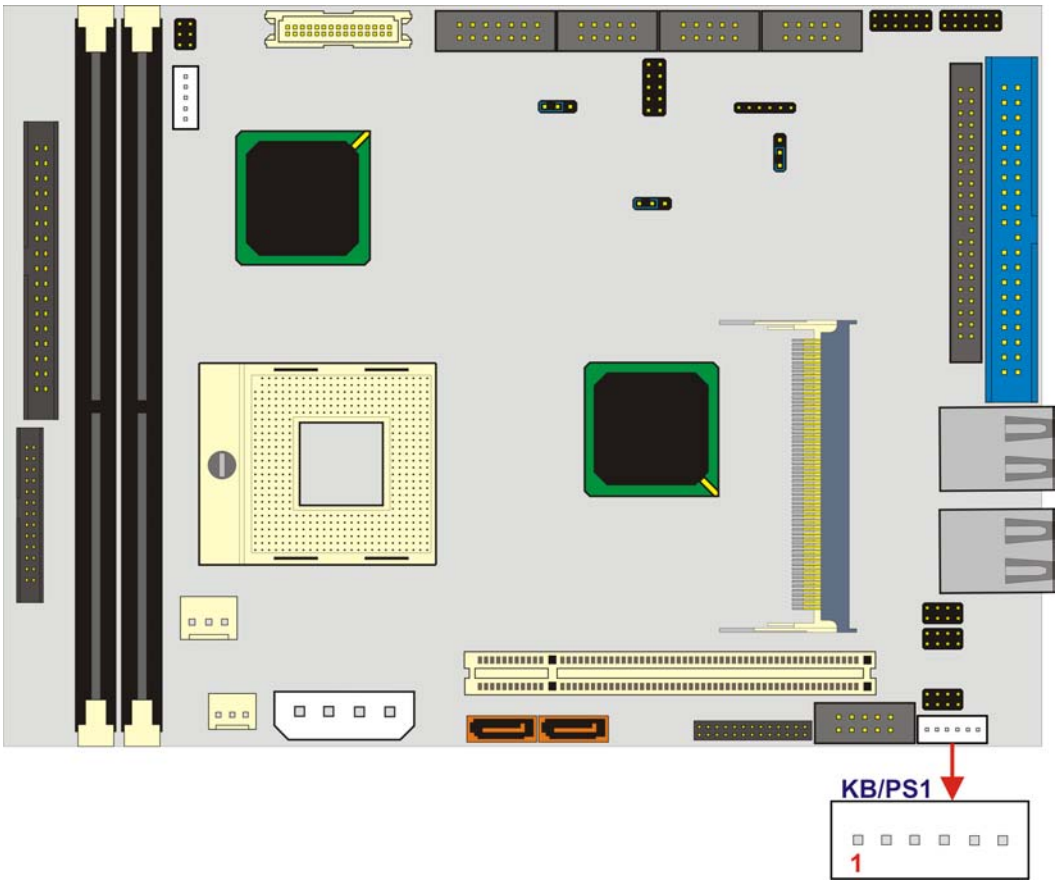


Figure 3-16: Keyboard/Mouse Connector Location

PIN NO.	DESCRIPTION
1	+5V_KB
2	MS DATA
3	MS CLK
4	KB DATA
5	KB CLK
6	GROUND

Table 3-17: Keyboard/Mouse Connector Pinouts

3.2.15 LCD LVDS Connector

CN Label: **LVDS1**

CN Type: 30-pin header (2x15)

CN Location: See **Figure 3-17**

CN Pinouts: See **Figure 3-17**

The LVDS LCD connector (LVDS1) connects to a one or two channel 18-bit LVDS panel.

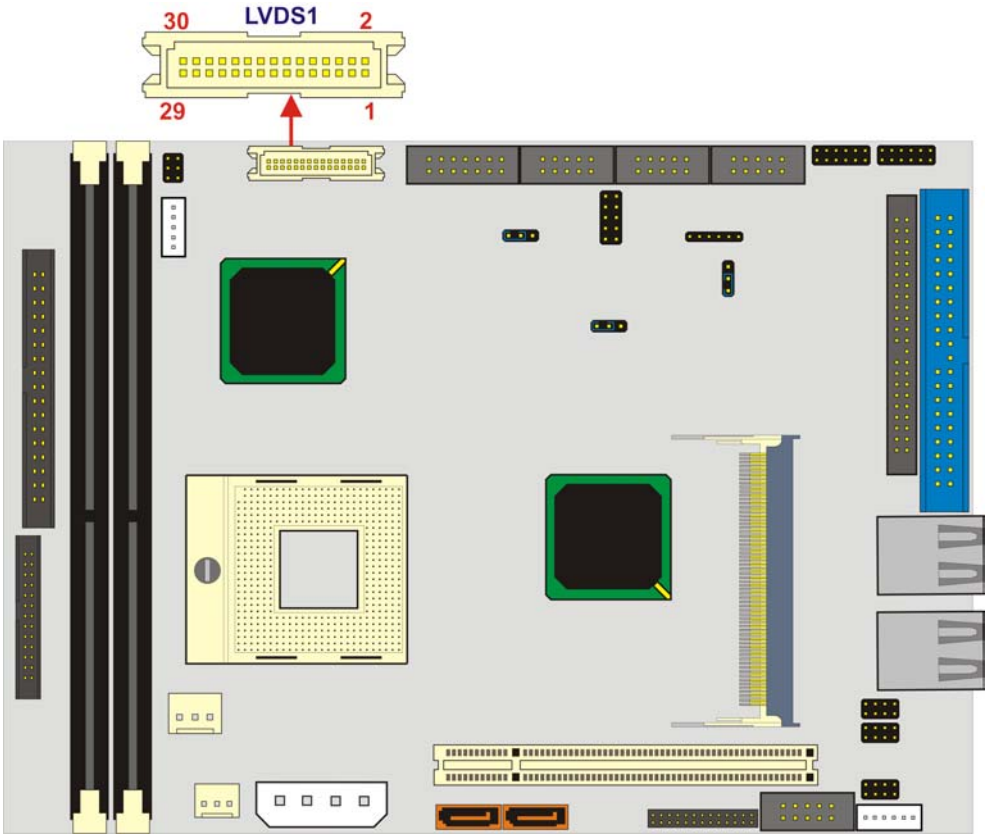


Figure 3-17: LVDS Connector Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	GND
3	A0P	4	A0N
5	A1P	6	A1N
7	A2P	8	A2N
9	CLK1P	10	CLK1N
11	A3P	12	A3N
13	GND	14	GND
15	A4P	16	A4N
17	A5P	18	A5N
19	A6P	20	A6N
21	CLK2P	22	CLK2N
23	A7P	24	A7N
25	GND	26	GND

27	LCD_VDD	28	LCD_VDD
29	LCD_VDD	30	LCD_VDD

Table 3-18: LCD LVDS Connector Pinouts

3.2.16 Parallel Port Connector

CN Label: **LPT1**

CN Type: 26-pin box header

CN Location: See **Figure 3-18**

CN Pinouts: See **Table 3-19**

The NOVA-8522G2 has one 26 pin box header that can be connected to a parallel port connector interface or some other parallel port device such as a printer.

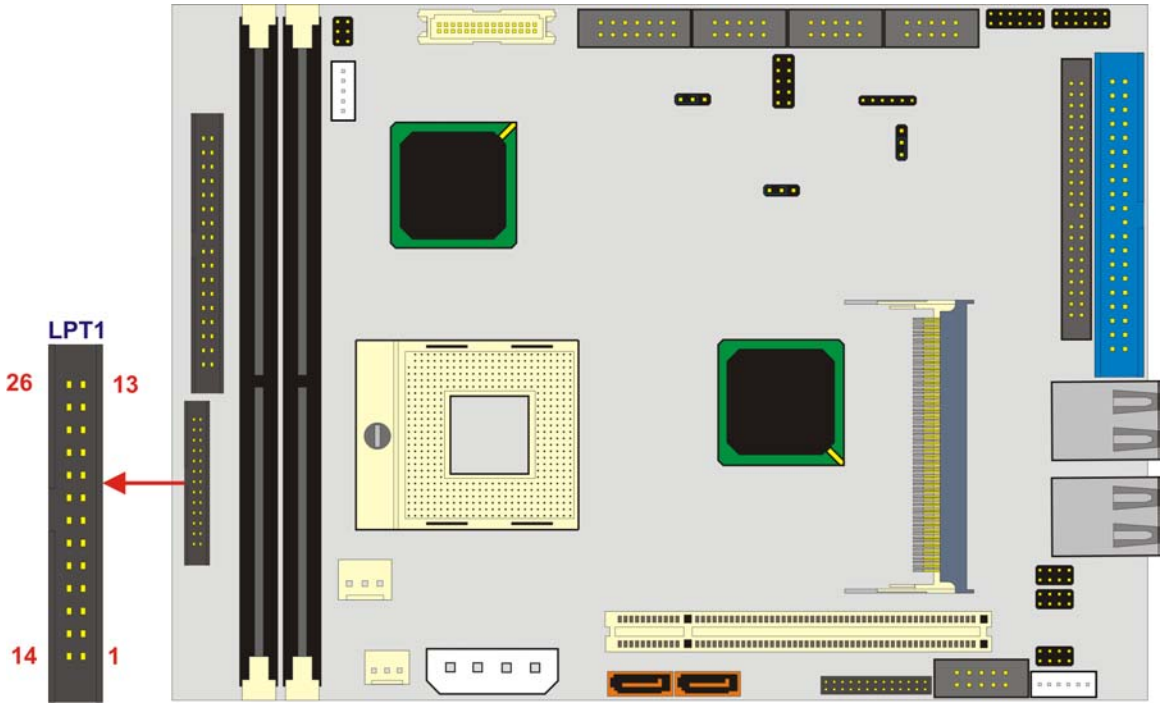


Figure 3-18: Parallel Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE
17	PRINTER SELECT LN#	18	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND	24	GROUND
25	GROUND	26	NC

Table 3-19: Parallel Port Connector Pinouts

3.2.17 RS-232 Serial Port Connectors

CN Label: **COM1**, **COM2** and **COM3**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 3-19**

CN Pinouts: See **Table 3-20**

The COM1, COM2 and COM3 serial port connectors connect to RS-232 serial port devices.

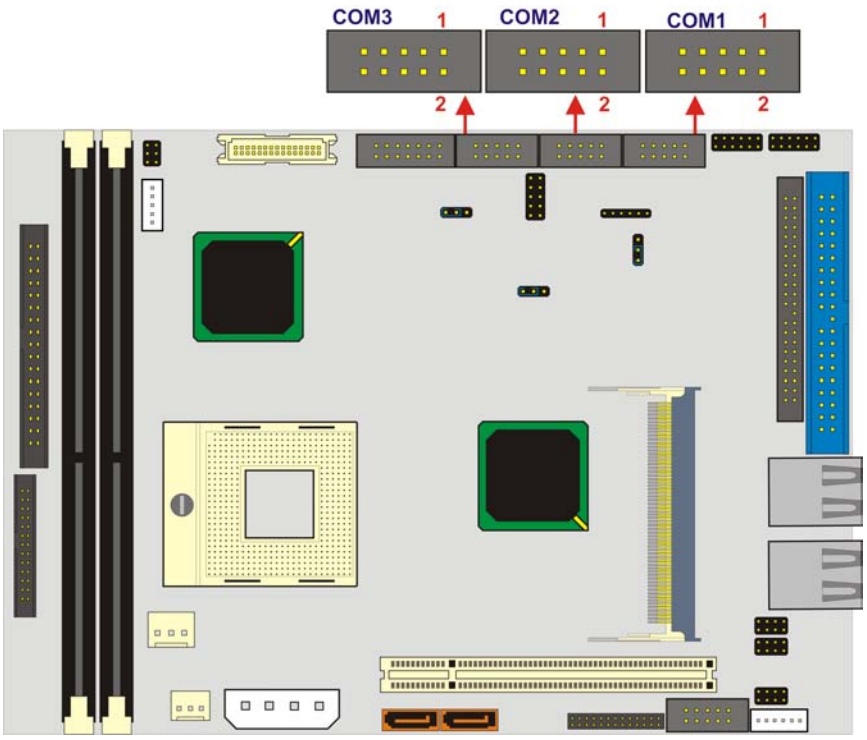


Figure 3-19: RS-232 Serial Port Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND

Table 3-20: RS-232 Serial Port Connector Pinouts

3.2.18 RS-232/422/485 Serial Port Connector

CN Label: **COM4**

CN Type: 14-pin header (2x7)

CN Location: See **Figure 3-20**

CN Pinouts: See **Table 3-21**

The COM2 serial port connector connects to an RS-232, RS-422 or RS-485 serial port devices.

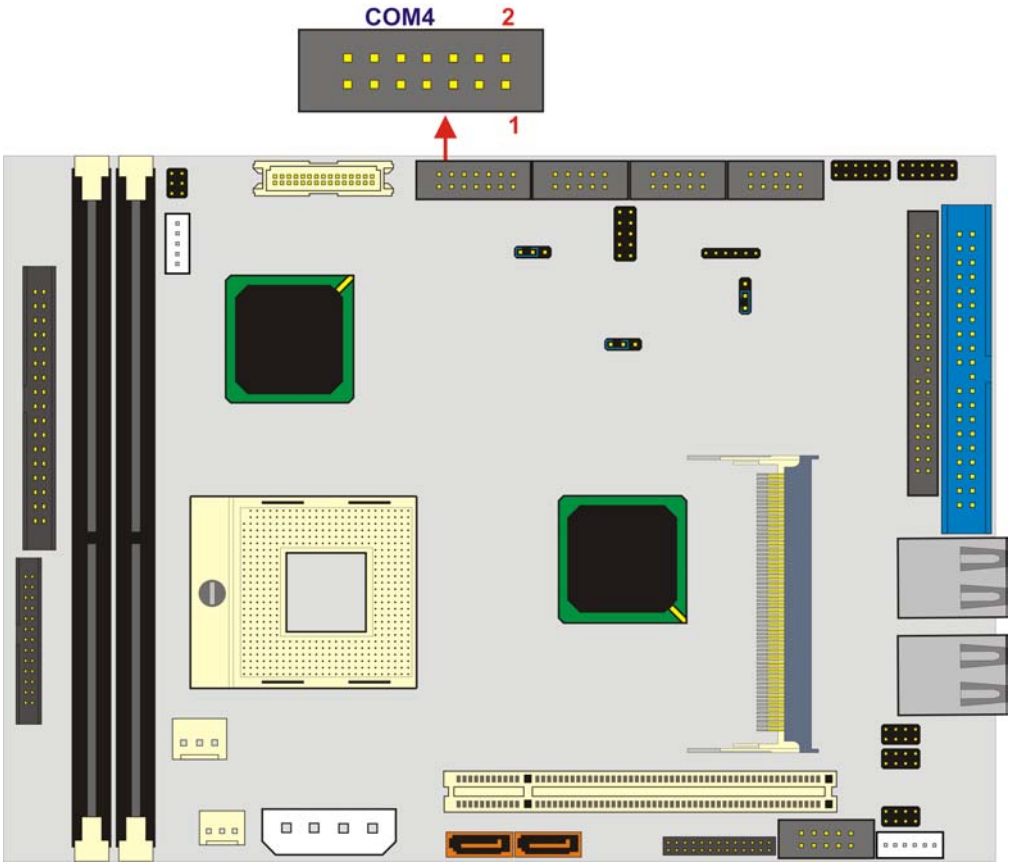


Figure 3-20: RS-232/422/485 Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND
11	TX+ (RS-422/485)	12	TX- (RS-422/485)
13	RX+ (RS-422)	14	RX- (RS-422)

Table 3-21: RS-232/RS-422/RS-485 Serial Port Connector Pinouts

3.2.19 SATA Drive Connectors

CN Label: **SATA1** and **SATA2**

CN Type: 7-pin SATA drive connectors

CN Location: See **Figure 3-22**

CN Pinouts: See **Table 3-23**

The two SATA drive connectors are connected to two first generation SATA drives. First generation SATA drives transfer data at speeds as high as 150MB/s.

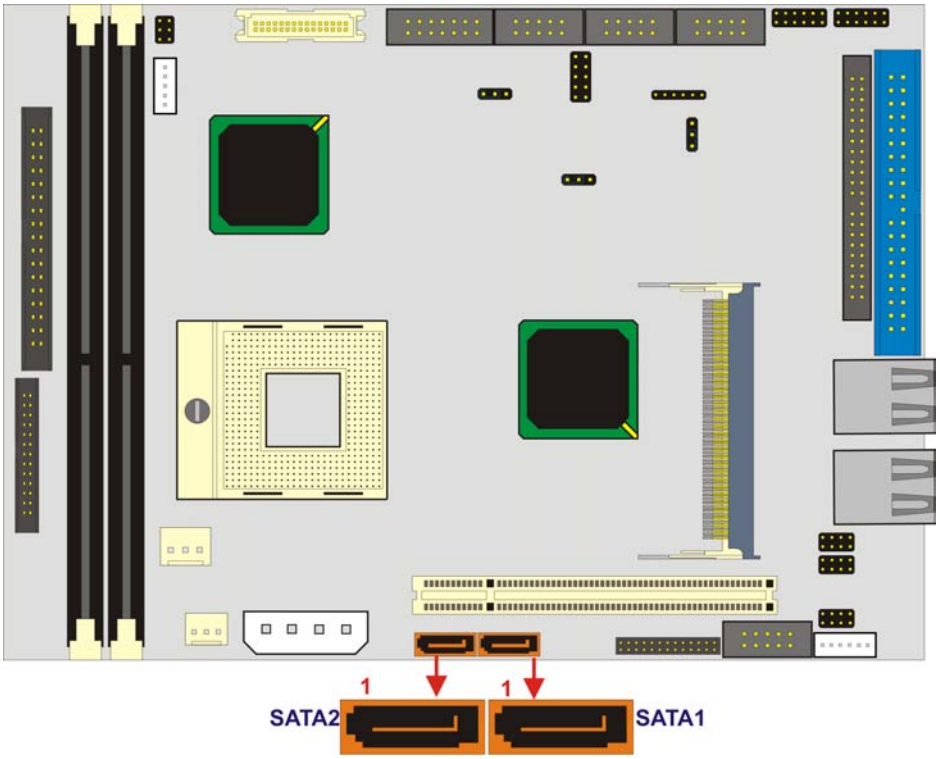


Figure 3-21: SATA Drive Connector Locations

PIN NO.	DESCRIPTION
1	GND
2	TX+
3	TX-
4	GND

5	RX-
6	RX+
7	GND

Table 3-22: SATA Drive Connector Pinouts

3.2.20 Internal USB Connectors

CN Label: **USB1**, **USB2** and **USB3**

CN Type: 8-pin header (2x4)

CN Location: See **Figure 3-22**

CN Pinouts: See **Table 3-23**

The 2x4 USB pin connectors provide connectivity USB 2.0 ports. Each USB connector can support two USB devices. The USB ports are used for I/O bus expansion.

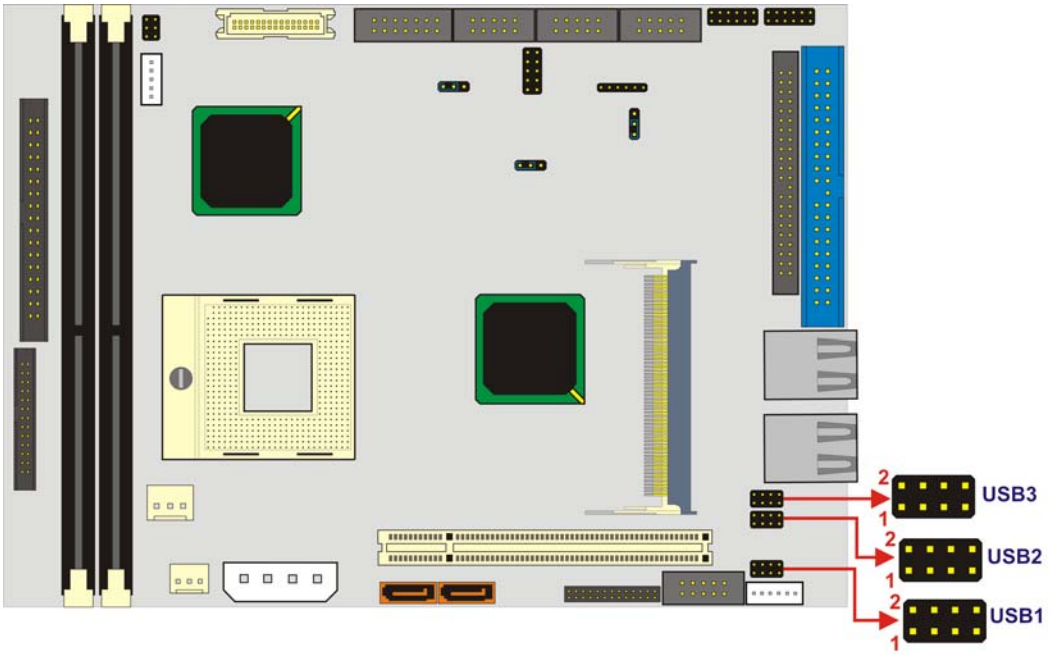


Figure 3-22: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC_USB	2	GND
3	DATA0-	4	DATA1+
5	DATA0+	6	DATA1-
7	GND	8	VCC_USB

Table 3-23: USB Port Connector Pinouts

3.2.21 VGA Connector (Internal)

CN Label: **VGA1**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 3-23**

CN Pinouts: See **Table 3-24**

The internal VGA connector connects to an external VGA display for system monitoring.

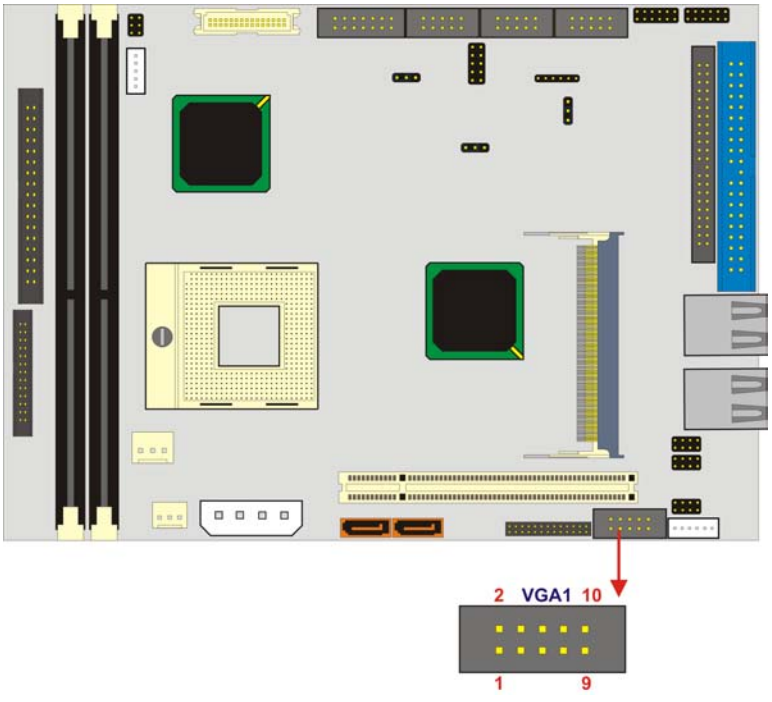


Figure 3-23: VGA Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	2	DDC CLK
3	GREEN	4	DDC DAT
5	BLUE	6	GND
7	HSYNC	8	GND
9	VSYNC	10	GND

Table 3-24: VGA Connector Pinouts

3.3 External (Rear Panel) Connectors

Figure 3-24 shows the NOVA-8522G2 rear panel. The NOVA-8522G2 rear panel consists of two RJ-45 Ethernet connectors. These connectors are accessible when the NOVA-8522G2 is installed in a chassis.

- 2 x RJ-45 GbE connector

Figure 3-24: NOVA-8522G2 Rear Panel

3.3.1 LAN Connectors

CN Label: **J7** and **J8** (See **Figure 3-24**)

CN Type: RJ-45

CN Location: See **Figure 3-24**

CN Pinouts: See **Table 3-25** (RJ-45)

The NOVA-8522G2 is equipped with two built-in GbE Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TX0+	8	TX2-
2	TX0-	9	TX3+
3	TX1+	10	TX3-
4	TX1-	11	LINK100#
5	VCC_LAN	12	LINK1000#
6	VCC_LAN	13	LINK#
7	TX2+	14	ACT#

Table 3-25: LAN Pinouts

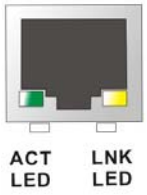


Figure 3-25: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 3-26**.

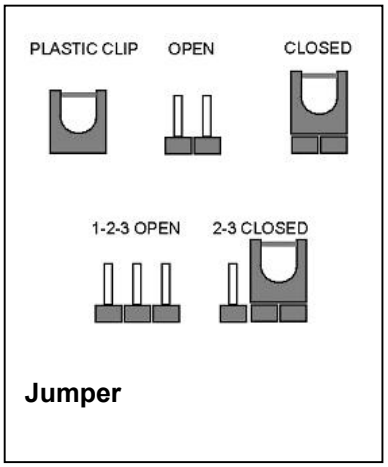
STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Activity	YELLOW	Linked

Table 3-26: RJ-45 Ethernet Connector LEDs

3.4 Onboard Jumpers

NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.



Jumper

The NOVA-8522G2 motherboard has four onboard jumpers. The jumpers are described in **Table 3-27**.

Description	Label	Type
Clear CMOS	JP1	3-pin header
CF card setup	JP2	3-pin header
LCD LVDS1 voltage setup	JP3	6-pin header
COM4 setup (RS-232/422/485)	JP4	3-pin header

Table 3-27: Jumpers

3.4.1 Clear CMOS Jumper

Jumper Label: **JP1**

Jumper Type: 3 pin header

Jumper Settings: See **Table 3-28**

Jumper Location: See **Figure 3-26**

If the NOVA-8522G2 fails to boot due to improper BIOS settings, use this jumper to clear the CMOS data and reset the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the “CMOS Settings Wrong” message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

Clear CMOS	DESCRIPTION
1-2 (Default)	Keep CMOS Setup
2-3	Clear CMOS Setup

Table 3-28: Clear CMOS Jumper Settings

The clear CMOS jumper location is shown in Figure 3-26.

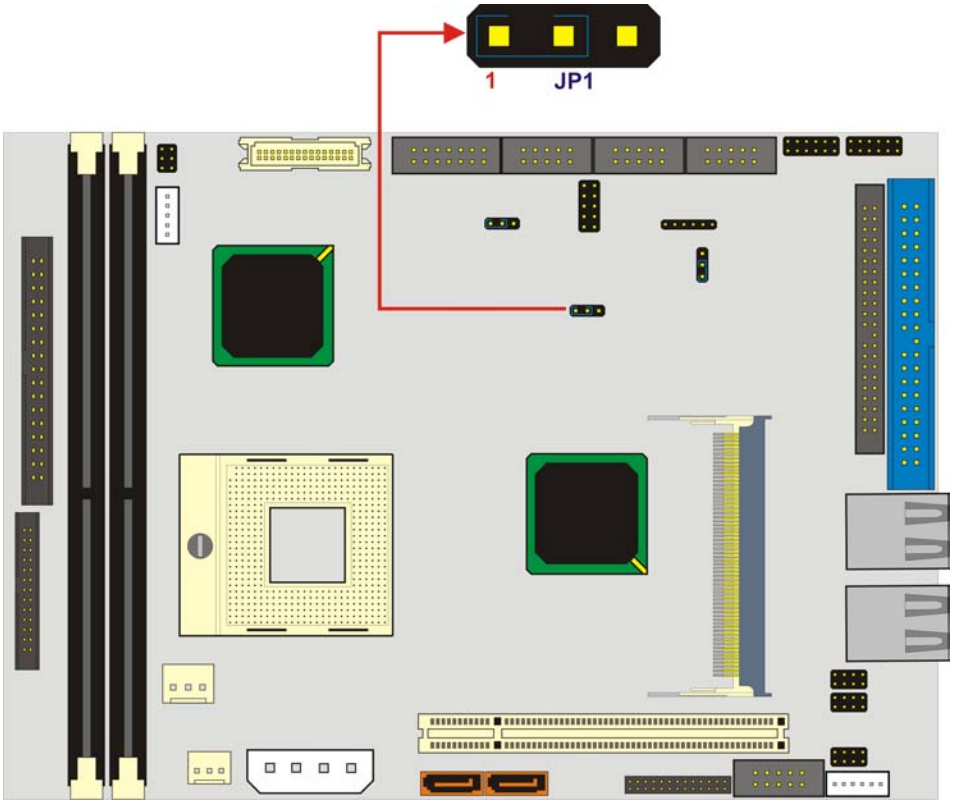


Figure 3-26: CLR_CMOS Pinout Locations

3.4.2 CF Card Setup

Jumper Label: JP2

Jumper Type: 3-pin header

Jumper Settings: See

Jumper Location: See Figure 3-27

The CF Card Setup jumper sets the CompactFlash card as either the slave device or the master device.

JP5	DESCRIPTION
OPEN (Default)	Slave
CLOSE 1-2	Master

Table 3-29: CF Card Setup Jumper Settings

The CF Card Setup jumper location is shown in Figure 3-26

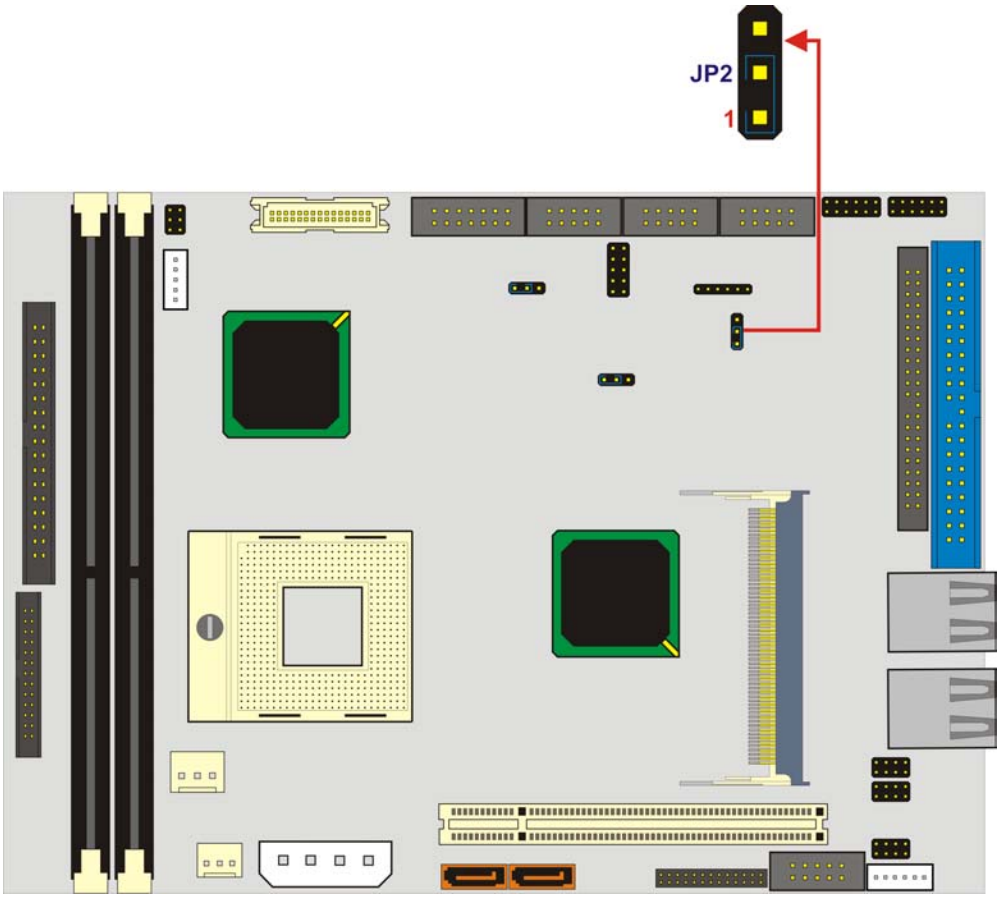


Figure 3-27: JP5 Pinout Locations

3.4.3 LCD Voltage Setup Jumper

WARNING:

Making the wrong setting on this jumper may cause irreparable damage to both the motherboard and the LCD screen connected to the onboard connector.

Jumper Label: **JP3**

Jumper Type: 6-pin header

Jumper Settings: See **Table 3-30**

Jumper Location: See **Figure 3-28**

This jumper allows the user to set the voltage for the LCD panel. Before setting this jumper please refer to the LCD panel user guide to determine the required voltage. After the required voltage is known, make the necessary jumper setting in accordance with the settings shown in **Table 3-30**.

JP3	DESCRIPTION
Short 1-2 (Default)	+3.3V
Short 3-4	+5V
Short 5-6	+12V

Table 3-30: JP3 Jumper Settings

The LCD Voltage Setup jumper location is shown in **Figure 3-28** below.

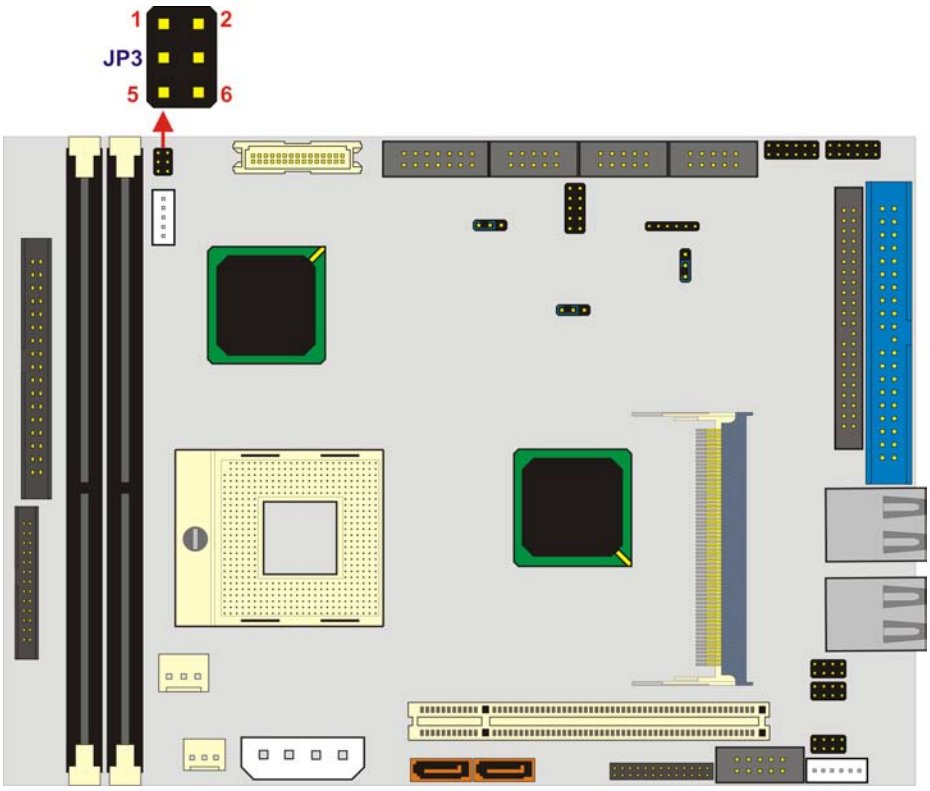


Figure 3-28: JP3 Pinout Locations

3.4.4 COM4 Setup Jumper (RS-232/422/485)

Jumper Label: JP4

Jumper Type: 3-pin header

Jumper Settings: See Table 3-30

Jumper Location: See Figure 3-28

This jumper configures the COM4 connector as an RS-232 serial port or as an RS-422 / RS-485 serial port. The selection options are shown in **Table 3-30**.

COM4	DESCRIPTION
Short 1 – 2 (Default)	**RS-232**
Short 2 – 3	**RS-422 / RS-485**

Table 3-31: COM4 Setup Jumper Settings

The COM4 Setup jumper location is shown in Figure 3-28 below.

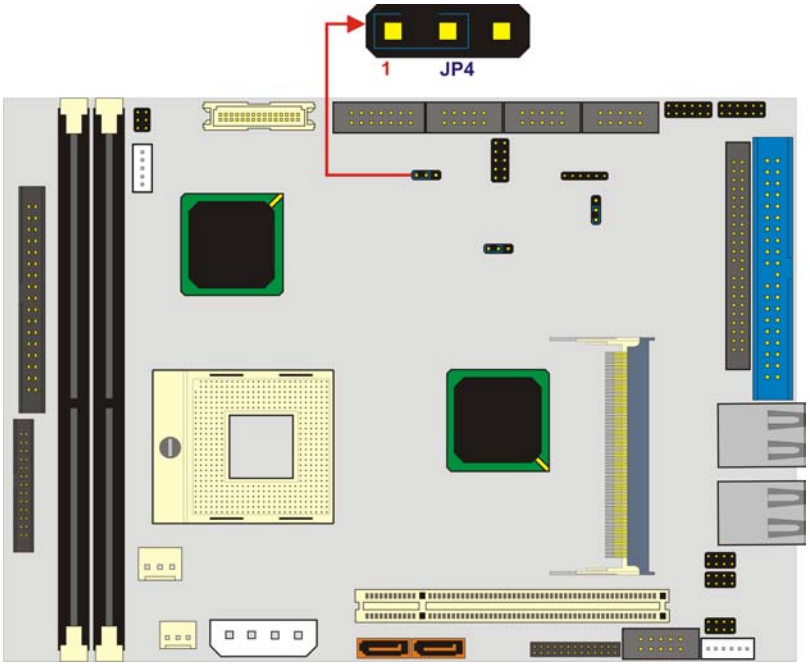


Figure 3-29: COM4 Setup Jumper Pinout Locations

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Chapter

4

Installation and Configuration

4.1 Anti-static Precautions

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NOVA-8522G2. (Dry climates are especially susceptible to ESD.) It is therefore critical that whenever the NOVA-8522G2 (or any other electrical component) is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wrist band***: - Wearing a simple anti-static wrist band can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.

4.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the motherboard is installed. All installation notices pertaining to the installation of the motherboard should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the motherboard and injury to the person installing the motherboard.

4.2.1 Installation Notices

Before and during the installation of the NOVA-8522G2, please **do** the following:

- **Read the user manual**:
  - The user manual provides a complete description of the NOVA-8522G2, installation instructions and configuration options.
- **Wear an electrostatic discharge cuff (ESD)**:
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- **Place the motherboard on an antistatic pad**:

- When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.

- **Turn off all power to the NOVA-8522G2**:
  - When working with the motherboard, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the NOVA-8522G2 **DO NOT:**

- remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- use the product before verifying all the cables and power connectors are properly connected.
- allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.3 Unpacking

NOTE:

If any of the items listed below are missing when the NOVA-8522G2 is unpacked, do not proceed with the installation and contact the NOVA-8522G2 reseller or vendor.

4.3.1 Unpacking Precautions

Before installing the NOVA-8522G2, unpack the motherboard. Some components on NOVA-8522G2 are very sensitive to static electricity and can be damaged by a sudden rush of power. To protect it from being damaged, follow these precautions:

- The user should ground them self to remove any static charge before touching the NOVA-8522G2. To do so wear a grounded wrist strap at all times or frequently touch any conducting materials that is connected to the ground.
- Handle the NOVA-8522G2 by its edges. Do not touch the IC chips, leads or circuitry if not necessary.

Do not place a PCB on top of an anti-static bag. Only the inside of the bag is safe from static discharge.

4.3.2 Checklist

When unpacking the NOVA-8522G2, please make sure that the package contains the following items.

- 1x NOVA-8522G2 single board computer
- 1 x IDE flat cable 40P/40P/40P
- 1 x 2.54 pitch KB/PS2 mouse cable
- 2 x SATA cable
- 1 x SATA power cable
- 1 x audio cable
- 1 x VGA cable
- 3 x 2.54 pitch RS-232 cables (without brackets)
- 1 x RS-232/422/485 cable (without bracket)
- 1x 2.54 pitch USB cable (without bracket)
- 1 x Mini jumper pack
- 1x Utility CD
- 1x Quick Installation Guide

If one or more of these items are missing, please contact the reseller or vendor the NOVA-8522G2 was purchased from and do not proceed any further with the installation.

4.4 NOVA-8522G2Motherboard Installation

WARNING!

1. Never run the motherboard without an appropriate heatsink and cooler that can be ordered from IEI Technology or purchased separately.
2. Be sure to use the CPU 12V power connector (CN10007) for the CPU power.

WARNING!

Please note that the installation instructions described in this manual should be carefully followed in order to avoid damage to the motherboard components and injury to the user.

WARNING!

When installing electronic components onto the motherboard always take the anti-static precautions listed above in order to prevent ESD damage to the motherboard and other electronic components like the CPU and DIMM modules

The following components must be installed onto the motherboard or connected to the motherboard during the installation process.

NOTE:

Some NOVA-8522G2 models already have preinstalled CPUs. If the motherboard has a preinstalled CPU then the following section on CPU installation can be skipped.

- CPU
- CPU cooling kit
- DIMM modules
- Peripheral device connection

4.4.1 CPU Installation

WARNING!

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure that a heatsink and CPU cooling fan is properly installed before the motherboard is run or else both the CPU and the board may be damaged.

To install an Intel 479-pin CPU onto the motherboard, follow the steps below:

Step 1: **Is the CPU retention screw in an unlocked position?** When shipped, the retention screw of the CPU socket should be in the unlocked position. If it is not in the unlocked position, use a screwdriver to position it in an unlocked position. (See **Figure 4-1**)

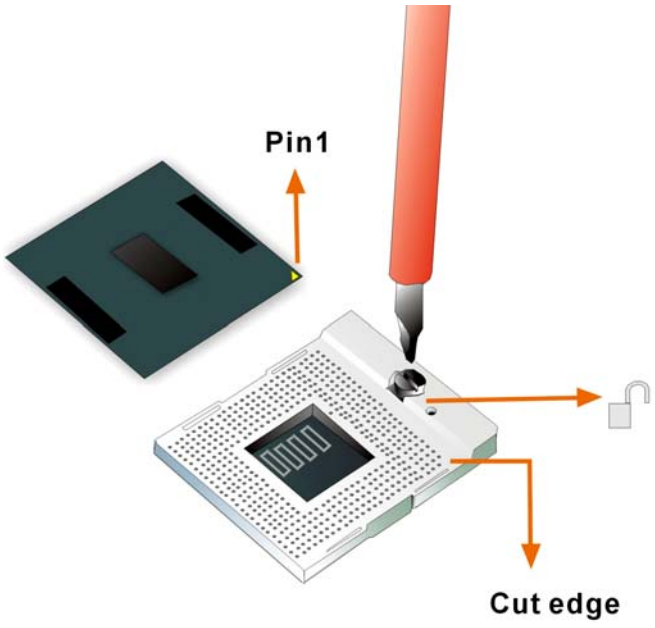

Figure 4-1: Make sure the CPU socket retention screw is unlocked

Step 2: **Inspect the CPU socket.** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 3: **Correctly position the CPU.** Make sure the pin 1 mark matches the cut edge on the CPU socket. Carefully place the CPU on top of the socket. When properly placed, the CPU should be easily inserted into the socket.

Step 4: **Insert the CPU.** To insert the CPU into the socket, hold the CPU by its edges and follow the instructions below:

Correctly orientate the CPU with the IHS (Integrated Heat Sink) side facing upward.

a. Locate the pin 1 mark on the CPU.

b. Gently insert the CPU into the socket.

c. Rotate the retention screw into the locked position. (See **Figure 4-2**)

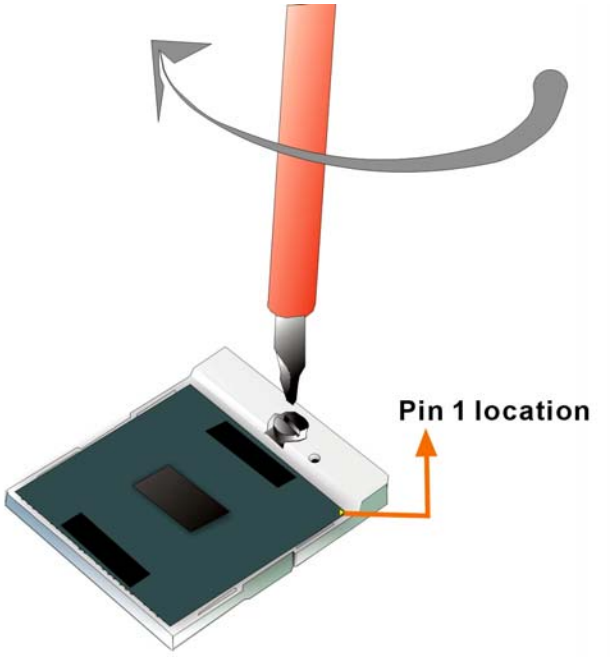

Figure 4-2: Lock the CPU Socket Retention Screw

4.4.2 Cooling Kit (CF-479B-RS) Installation

Figure 4-3: IEI CF-479B-RS Cooling Kit

IEI provides a cooling kit designed for socket 479 CPUs. (See **Figure 4-3**) The cooling kit is comprised of a CPU heat sink and a cooling fan.

NOTE:

The CF-479B-RS heat sink comes with a sprayed layer of thermal paste. Make sure the paste is not accidentally wiped during the unpacking or installation of the heat sink. Thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the CF-479B-RS cooling kit, please follow the steps below.

Step 1: **Place the cooling kit onto the CPU**. Make sure the CPU cable can be properly routed when the cooling kit is installed.

Step 2: **Properly align the cooling kit**. Make sure its four spring screw fasteners can pass through the pre-drilled holes on the PCB.

Step 3: **Secure the cooling kit**. From the solder side of the PCB, align the support bracket to the screw threads on heat sink that were inserted through the PCB holes. (See **Figure 4-4**)

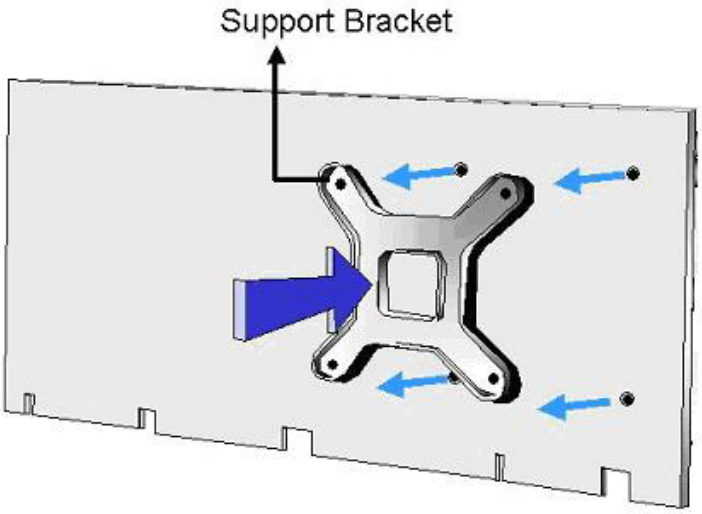

Figure 4-4: Cooling Kit Support Bracket

Step 4: **Tighten the screws**. Use a screwdriver to tighten the four screws. Tighten each nut a few turns at a time and do not over-tighten the screws.

Step 5: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the motherboard. Carefully route the cable and avoid heat generating chips and fan blades. (See **Figure 4-5**)

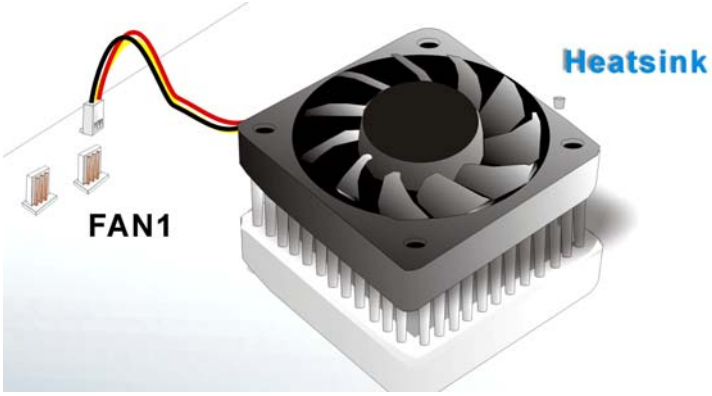

Figure 4-5: Connect the cooling fan cable

4.4.3 DIMM Module Installation

4.4.3.1 Purchasing the Memory Module

When purchasing DIMM modules, the following considerations should be taken into account:

- The DIMM module can support a memory chip with a maximum size of 1GB
- The DIMM module supports SDRAM DIMM speeds of 333MHz and 400MHz

4.4.3.2 DIMM Module Installation

The NOVA-8522G2 motherboard has two DDR SDRAM DIMM sockets. To install the DIMM modules, follow the instructions below and refer to ***Figure 4-6***.

Step 1: Pull the two white handles on either side of the DIMM socket down.

Step 2: Align the DIMM module with the DIMM socket making sure the matching pins are correctly aligned.

Step 3: Insert the DIMM module slowly. Once it is correctly inserted, push down firmly. The white handles on either side of the socket move back up and lock the module into the socket.

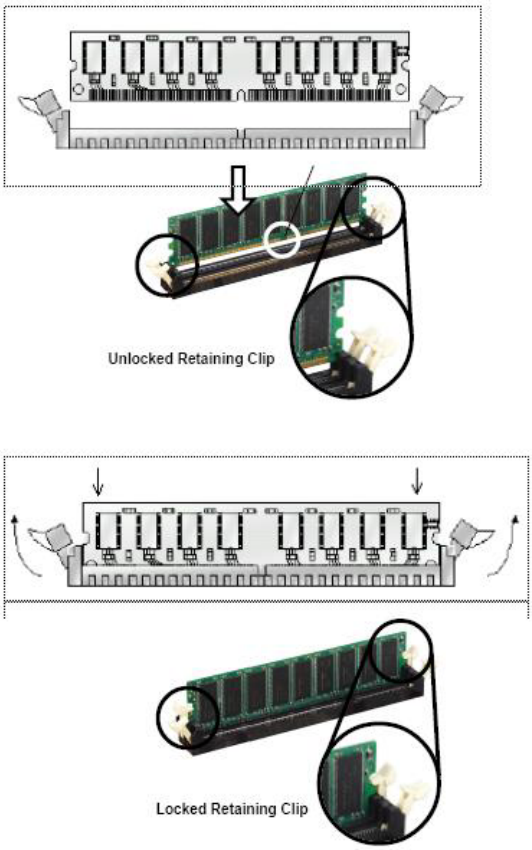

Figure 4-6: DIMM Module Installation

4.4.4 Peripheral Device Connection

Cables provided by IEI that connect peripheral devices to the motherboard are listed in **Table 4-1**. Cables not included in the kit must be separately purchased.

Quantity	Type
1	ATA 66/100 flat cable
2	SATA cables
1	SATA power cable
1	RS-232 cable
1	USB cable

Table 4-1: IEI Provided Cables

4.4.4.1 IDE Disk Drive Connector (IDE1)

The cable used to connect the ,otherboard to the IDE HDD is a standard 44-pin ATA 66/100 flat cable. To connect an IDE HDD to the motherboard, follow the instructions below.

Step 1: Find the ATA 66/100 flat cable in the kit that came with the motherboard.

Step 2: Connect one end of the cable to the PIDE1 connector on the motherboard. A keyed pin on the IDE connectors prevents it from being connected incorrectly.

Step 3: Locate the red wire on the other side of the cable that corresponds to the pin 1 connector.

Step 4: Connect the other side of the cable to the HDD making sure that the pin 1 cable corresponds to pin 1 on the connector.

NOTE:

When two EIDE disk drives are connected together, back-end jumpers on the drives must be used to configure one drive as a master and the other as a slave.

4.5 Chassis Installation

After the CPU, the cooling kit, and the DIMM modules have been installed and after the internal peripheral connectors have been connected to the peripheral devices and the jumpers have been configure, the motherboard can be mounted into chassis.

To mount the motherboard into a chassis please refer to the chassis user guide that came with the product.

4.6 Rear Panel Connectors

4.6.1 Ethernet Connection

The rear panel RJ-45 connectors can be connected to an external LAN and communicate with data transfer rates up to 1Gb/s.

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Chapter

5

AMI BIOS Setup

5.1 Introduction

A licensed copy of AMI BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

5.1.1 Starting Setup

The AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before, restart the computer and try again.

5.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **Esc** to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu

F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

5.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in Chapter **Chapter 3**, **Section 0**.

5.1.5 BIOS Menu Bar

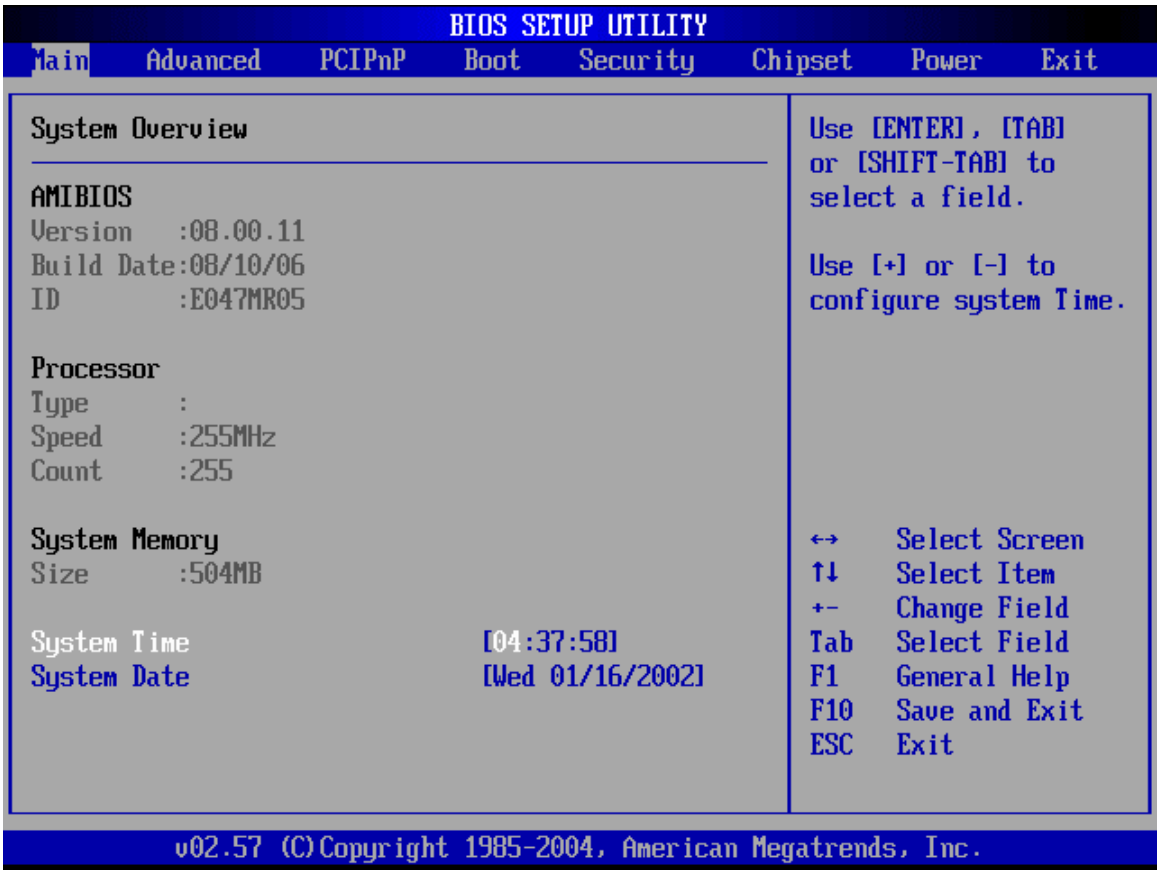
The **menu bar** on top of the BIOS screen has the following main items:

- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **Power** Changes power management settings.
- **Exit** Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

When the **BIOS Setup** program is entered, the **Main** menu (**BIOS Menu 1**) appears. The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

➔ **System Overview**

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- **AMI BIOS**: Displays auto-detected BIOS information
  - **Version**: Current BIOS version
  - **Build Date**: Date the current BIOS version was made
  - **ID**: Installed BIOS ID
- **Processor**: Displays auto-detected CPU specifications

- **Type**: Names the currently installed processor
- **Speed**: Lists the processor speed
- **Count**: The number of CPUs on the motherboard

- **System Memory**: Displays the auto-detected system memory.
  - **Size**: Lists memory size

The System Overview field also has two user configurable fields:

- **System Time [xx:xx:xx]**: The system time is set here.
- **System Date [Day xx/xx/xxxx]**: The system date is set here.

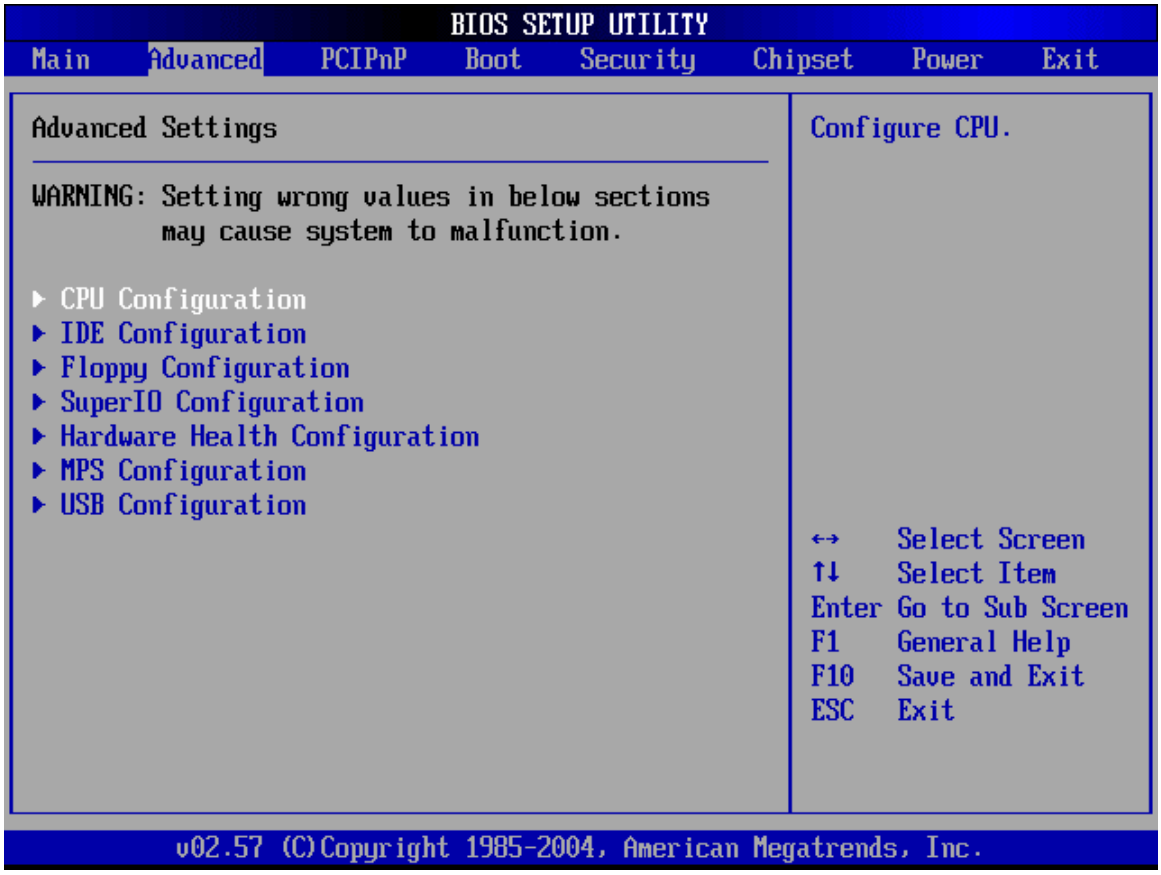
5.3 Advanced

The **Advanced** menu (**BIOS Menu 2**) allows access to the CPU and peripheral device configuration options through the following sub-menus:

WARNING:

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

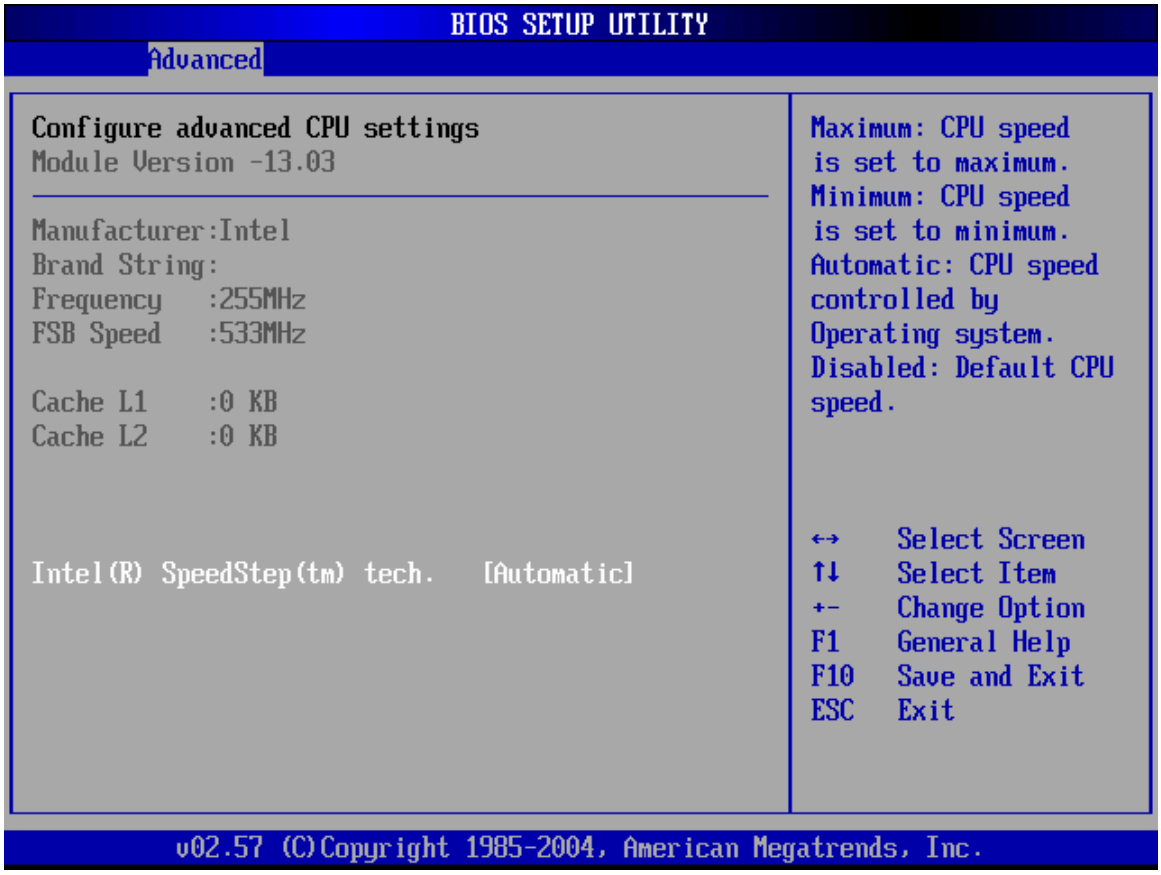
- **CPU Configuration** (see **Section 5.3.1**)
- **IDE Configuration** (see **Section 5.3.2**)
- **Floppy Configuration** (see **Section 5.3.3**)
- **SuperIO Configuration** (see **Section 5.3.4**)
- **Hardware Health Configuration** (see Section **5.3.5**)
- **MPS Configuration** (see **Section 5.3.6**)
- **USB Configuration** (see **Section 5.3.7**)



BIOS Menu 2: Advanced

5.3.1 CPU Configuration

The **CPU Configuration** menu (BIOS Menu 3) shows detailed CPU specifications and CPU configuration options.


BIOS SETUP UTILITY
Advanced
Configure advanced CPU settings
Module Version -13.03
Manufacturer:Intel
Brand String:
Frequency :255MHz
FSB Speed :533MHz
Cache L1 :0 KB
Cache L2 :0 KB
Intel(R) SpeedStep(tm) tech. [Automatic]
Maximum: CPU speed is set to maximum. Minimum: CPU speed is set to minimum. Automatic: CPU speed controlled by Operating system. Disabled: Default CPU speed.
↔ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.57 (C)Copyright 1985-2004, American Megatrends, Inc.

BIOS Menu 3: CPU Configuration

The CPU Configuration menu (BIOS Menu 3) lists the following CPU details:

- **Manufacturer**: Lists the name of the CPU manufacturer
- **Brand String**: Lists the brand name of the CPU being used
- **Frequency:** Lists the CPU processing speed
- **FSB Speed**: Lists the FSB speed
- **Cache L1**: Lists the CPU L1 cache size
- **Cache L2**: Lists the CPU L2 cache size

The following **CPU Configuration** menu items can be configured.

➔ **Intel ® SpeedStep ™ tech.**

Use the **Intel ® SpeedStep ™ tech.** option to set the operational speed of the CPU clock.

➔ **Maximum** (Default) The CPU operates at maximum speed

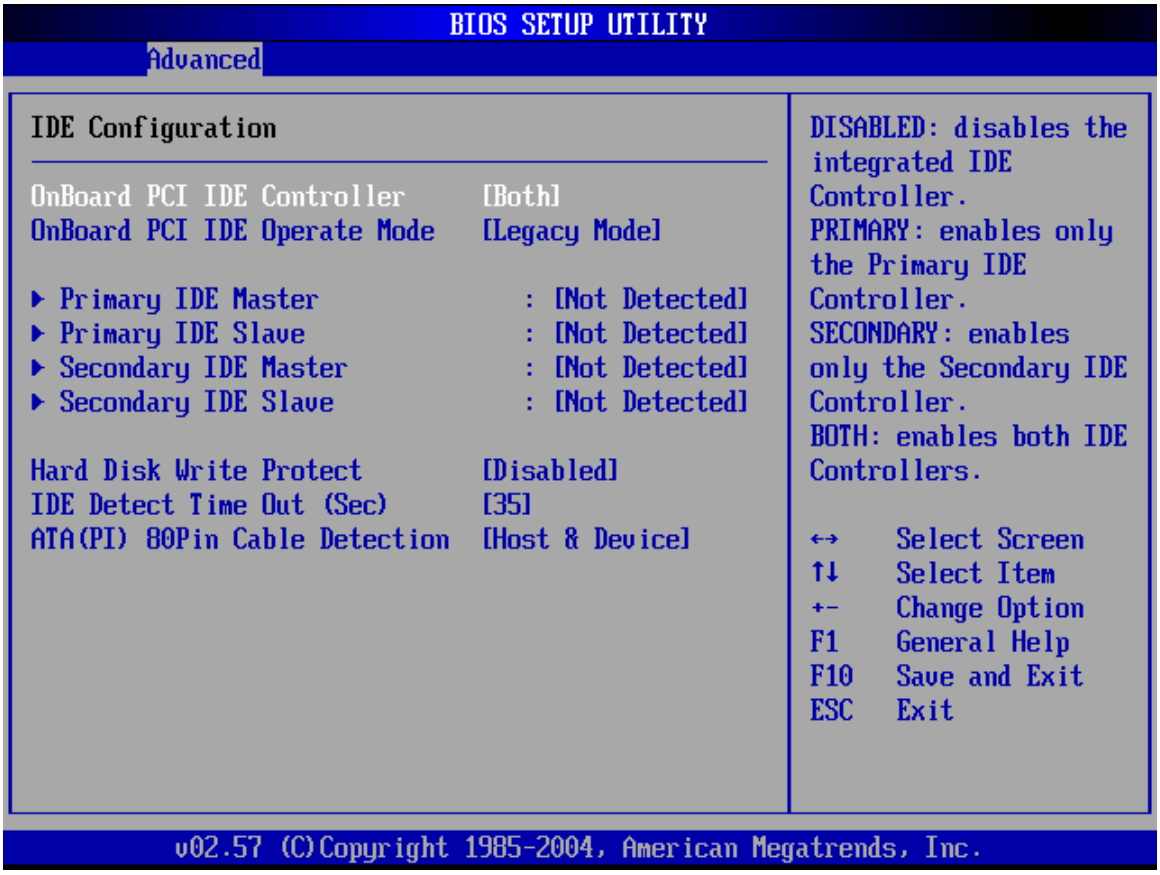
➔ **Minimum** The CPU operates at minimum speed

➔ **Automatic** The CPU speed is controlled by the operating system

➔ **Disabled** The CPU operates at the default CPU speed

5.3.2 IDE Configuration

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system.


BIOS SETUP UTILITY
Advanced
IDE Configuration
OnBoard PCI IDE Controller [Both]
OnBoard PCI IDE Operate Mode [Legacy Mode]
▸ Primary IDE Master : [Not Detected]
▸ Primary IDE Slave : [Not Detected]
▸ Secondary IDE Master : [Not Detected]
▸ Secondary IDE Slave : [Not Detected]
Hard Disk Write Protect [Disabled]
IDE Detect Time Out (Sec) [35]
ATA(PI) 80Pin Cable Detection [Host & Device]
DISABLED: disables the integrated IDE Controller.
PRIMARY: enables only the Primary IDE Controller.
SECONDARY: enables only the Secondary IDE Controller.
BOTH: enables both IDE Controllers.
↔ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.57 (C)Copyright 1985-2004, American Megatrends, Inc.

BIOS Menu 4: IDE Configuration

➔ **OnBoard PCI IDE Controller [Both]**

Use the **OnBoard PCI IDE Controller** BIOS option to specify the IDE channels used by the onboard PCI IDE controller. The following configuration options are available.

➔ **Disabled**		Prevents the system from using the onboard IDE controller
➔ **Primary**		Only allows the system to detect the Primary IDE channel, including both the Primary Master and the Primary Slave
➔ **Secondary**		Only allows the system to detect the Secondary IDE channel, including both the Secondary Master and Secondary Slave
➔ **Both**	**DEFAULT**	Allows the system to detect both the Primary and Secondary IDE channels including the Primary Master, Primary Slave, Secondary Master and Secondary Slave.

➔ **Onboard PCI IDE Operate Mode [Legacy Mode]**

Use the **Onboard PCI IDE Operate Mode** BIOS option to set the running mode for the PCI IDE.

➔ **Legacy Mode**	(Default)	The PCI IDE mode is the same as the IDE mode
➔ **Native Mode**		The PCI IDE mode is the native mode

➔ **IDE Master and IDE Slave**

When entering setup, BIOS auto detects the presence of IDE devices. This displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

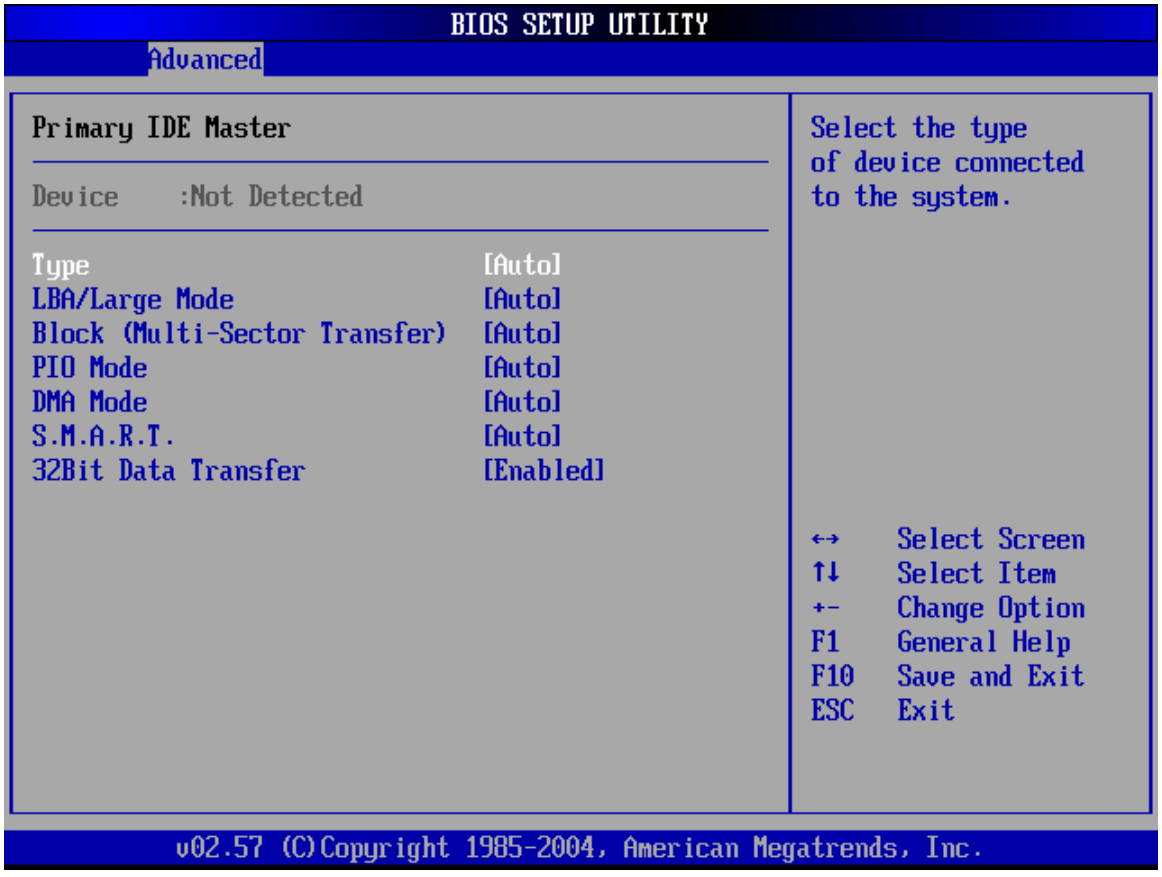
- Primary IDE Master

- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 5.3.2.1** appear.

5.3.2.1 IDE Master, IDE Slave

IDE Master and IDE Slave configuration options for both primary and secondary IDE devices are shown in the BIOS menu below.



BIOS Menu 5: IDE Master and IDE Slave Configuration

➔ **Auto-Detected Drive Parameters**

The “grayed-out” items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- **Device**: Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Type**: Indicates the type of devices a user can manually select
- **LBA Mode**: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode**: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.
- **PIO Mode**: Indicates the PIO mode of the installed device.
- **S.M.A.R.T.**: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- **32Bit Data Transfer**: Enables 32-bit data transfer.

➔ **Type [Auto]**

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

➔ **Not Installed**		BIOS is prevented from searching for an IDE disk drive on the specified channel.
➔ **Auto**	**DEFAULT**	The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.
➔ **CD/DVD**		The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.

➔ **ARMD** This option specifies an ATAPI Removable Media Device. These include, but are not limited to:

- ➔ **ZIP**
- ➔ **LS-120**

➔ **LBA/Large Mode [Auto]**

Use the **LBA/Large Mode** option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

➔ **Disabled** BIOS is prevented from using the LBA mode control on the specified channel.

➔ **Auto** **DEFAULT** BIOS auto detects the LBA mode control on the specified channel.

➔ **Block (Multi Sector Transfer) [Auto]**

Use the **Block (Multi Sector Transfer)** to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

➔ **Disabled** BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.

➔ **Auto** **DEFAULT** BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time.

➔ **PIO Mode [Auto]**

Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

➔ **Auto**	**DEFAULT**	BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.
➔ **0**		PIO mode 0 selected with a maximum transfer rate of 3.3MBps
➔ **1**		PIO mode 1 selected with a maximum transfer rate of 5.2MBps
➔ **2**		PIO mode 2 selected with a maximum transfer rate of 8.3MBps
➔ **3**		PIO mode 3 selected with a maximum transfer rate of 11.1MBps
➔ **4**		PIO mode 4 selected with a maximum transfer rate of 16.6MBps (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

➔ **Auto**	**DEFAULT**	BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.

➔ **S.M.A.R.T [Auto]**

Use the **S.M.A.R.T** option to auto-detect, disable or enable Self-Monitoring Analysis and Reporting Technology (SMART) on the drive on the specified channel. **S.M.A.R.T** predicts impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

➔ **Auto**	**DEFAULT**	BIOS auto detects HDD SMART support.
➔ **Disabled**		Prevents BIOS from using the HDD SMART feature.

➔ **Enabled** Allows BIOS to use the HDD SMART feature

➔ **32Bit Data Transfer [Enabled]**

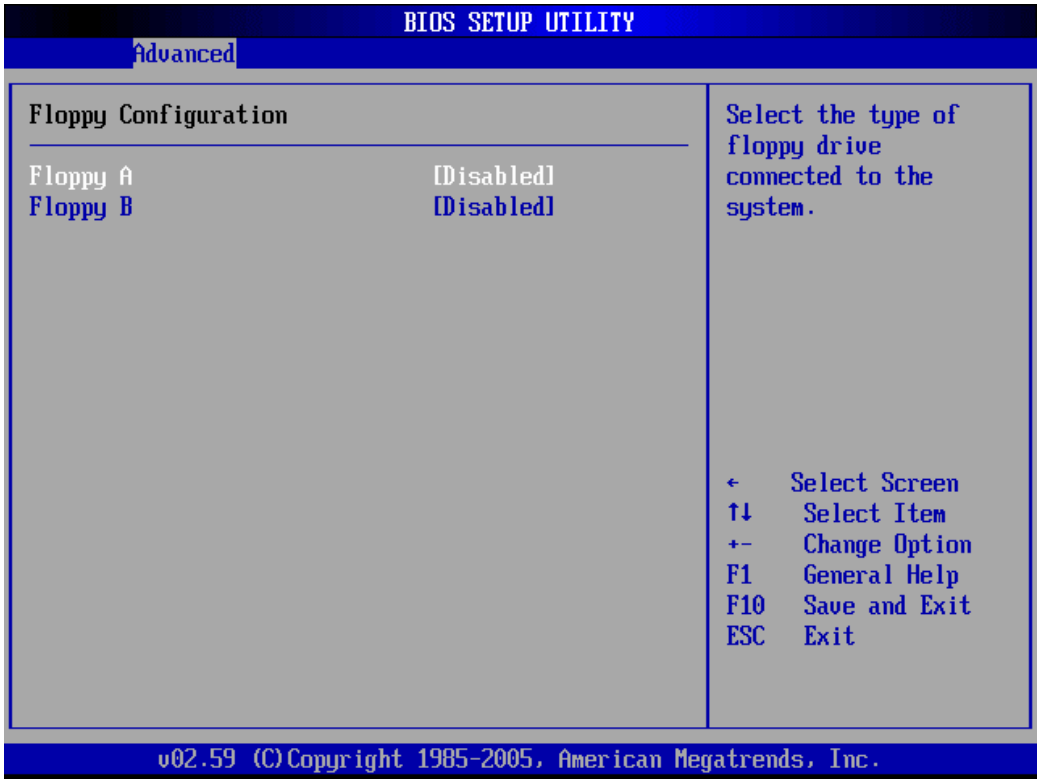
Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

➔ **Disabled** Prevents the BIOS from using 32-bit data transfers.

➔ **Enabled** **DEFAULT** Allows BIOS to use 32-bit data transfers on supported hard disk drives.

5.3.3 Floppy Configuration

Use the **Floppy Configuration** menu (**BIOS Menu 6**) to set or change the configurations for floppy disk drives.



BIOS Menu 6: Floppy Configuration

➔ **Floppy A [Disabled]**

The **Floppy A** configuration option determines the types of the floppy drive installed in the system. The following configuration options are available.

- Disabled (default)
- 360 KB 5¼”
- 1.2 MB 5¼”
- 720 KB 3 ½”
- 1.44 MB 3½”
- 2.88 MB 3½”

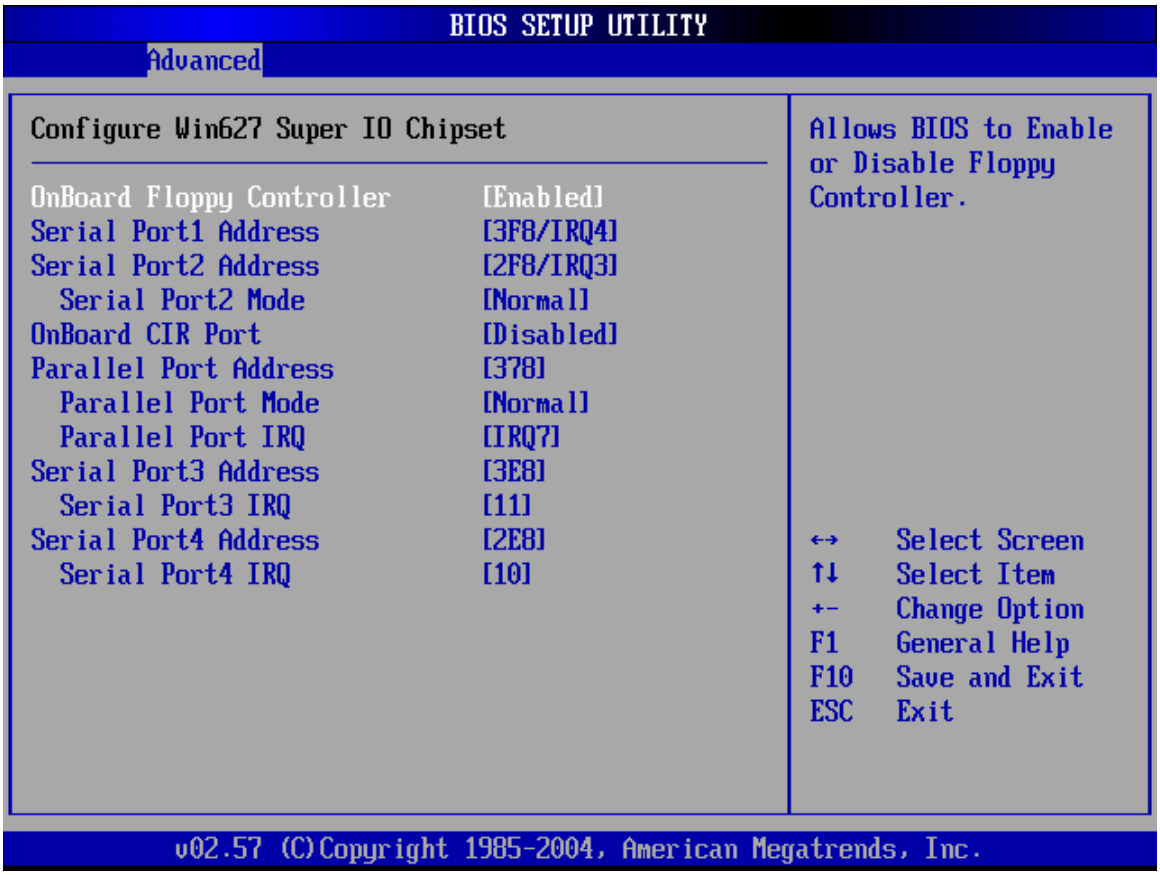
➔ **Floppy B [Disabled]**

The **Floppy B** configuration option determines the types of the floppy drive installed in the system. The following configuration options are available.

- Disabled (default)
- 360 KB 5¼”
- 1.2 MB 5¼”
- 720 KB 3 ½”
- 1.44 MB 3½”
- 2.88 MB 3½”

5.3.4 Super IO Configuration

The **Super IO Configuration** menu (**BIOS Menu 7**) sets or changes the configurations for the FDD controllers, parallel ports and serial ports.



BIOS Menu 7: Super IO Configuration

➔ **On Board Floppy Controller [Enabled]**

Use the **Onboard Floppy Controller** to enable or disable the floppy driver controller.

➔ **Disabled** BIOS disables the floppy controller

➔ **Enabled** (Default) BIOS enables the floppy controller

➔ **Serial Port1 Address [3F8/IRQ4]**

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

➔ **Disabled** No base address is assigned to Serial Port 1

- **3F8/IRQ4** **DEFAULT** Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4
- **3E8/IRQ4** Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4
- **2E8/IRQ3** Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Address [2F8/IRQ3]**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

- **Disabled** No base address is assigned to Serial Port 2
- **2F8/IRQ3** **DEFAULT** Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3
- **3E8/IRQ4** Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4
- **2E8/IRQ3** Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Mode [Normal]**

Use the **Serial Port2 Mode** option to select the Serial Port2 operational mode.

- **Normal** **DEFAULT** Serial Port 2 mode is normal
- **IrDA** Serial Port 2 mode is IrDA
- **ASK IR** Serial Port 2 mode is ASK IR

➔ **Onboard CIR Port [Disabled]**

Use the **Onboard CIR Port** option to select the CIR base address.

➔ **Disabled** **DEFAULT** No base address is assigned to CIR

➔ **3E0** CIR base address is 3E0

➔ **2E0** CIR base address is 2E0

➔ **Parallel Port Address [Disabled]**

Use the **Parallel Port Address** option to select the parallel port base address.

➔ **Disabled** **DEFAULT** No base address is assigned to the Parallel Port

➔ **378** Parallel Port I/O port address is 378

➔ **278** Parallel Port I/O port address is 278

➔ **3BC** Parallel Port I/O port address is 3BC

➔ **Parallel Port Mode [Normal]**

Use the **Parallel Port Mode** option to select the mode the parallel port operates in.

➔ **Normal** **DEFAULT** The normal parallel port mode is the standard mode for parallel port operation.

➔ **Bi-directional** Parallel port outputs are 8-bits long. Inputs are accomplished by reading 4 of the 8 bits on the status register.

➔ **EPP** The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode.

➔ **ECP+EPP** The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode

supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode

The parallel port is also be compatible with EPP devices described above

➔ **Parallel Port IRQ [IRQ7]**

Use the **Parallel Port IRQ** selection to set the parallel port interrupt address.

- ➔ **IRQ5** IRQ5 is assigned as the parallel port interrupt address
- ➔ **IRQ7** **DEFAULT** IRQ7 is assigned as the parallel port interrupt address

➔ **Serial Port3 Address [3E8]**

Use the **Serial Port3 Address** option to select the base address for serial port 3.

- ➔ **Disabled** No base address is assigned to serial port 3
- ➔ **3E8** (Default) Serial port 3 I/O port address is 3E8
- ➔ **2E8** Serial port 3 I/O port address is 2E8
- ➔ **2E0** Serial port 3 I/O port address is 2E0

➔ **Serial Port3 IRQ [11]**

Use the **Serial Port3 IRQ** selection to set the interrupt address for serial port 3.

- ➔ **10** Serial port 3 IRQ address is 10
- ➔ **11** (DEFAULT) Serial port 3 IRQ address is 11

➔ **Serial Port4 Address [2E8]**

Use the **Serial Port4 Address** option to select the base address for serial port 4.

➔ **Disabled** No base address is assigned to serial port 4

➔ **3E8** Serial port 4 I/O port address is 3E8

➔ **2E8** (Default) Serial port 4 I/O port address is 2E8

➔ **2E0** Serial port 4 I/O port address is 2E0

➔ **Serial Port4 IRQ [10]**

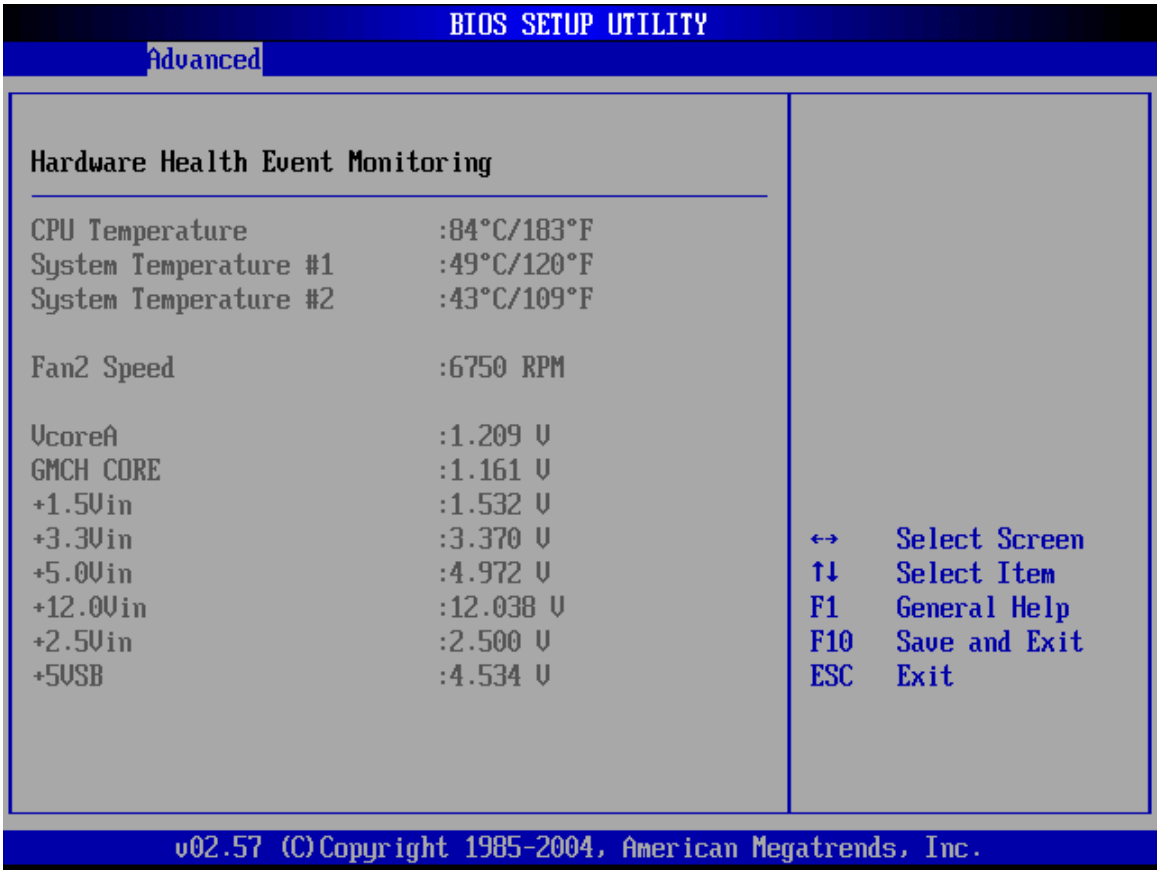
Use the **Serial Port4 IRQ** selection to set the interrupt address for serial port 4.

➔ **10** (DEFAULT) Serial port 4 IRQ address is 10

➔ **11** Serial port 4 IRQ address is 11

5.3.5 Hardware Health Configuration

The **Hardware Health Configuration** menu (BIOS Menu 8) shows the operating temperature, fan speeds and system voltages.



BIOS Menu 8: Hardware Health Configuration

The following system parameters and values are shown. The system parameters that are monitored are:

- **System Temperatures**: The following system temperatures are monitored
  - CPU Temperature
  - System Temperature #1
  - System Temperature #2

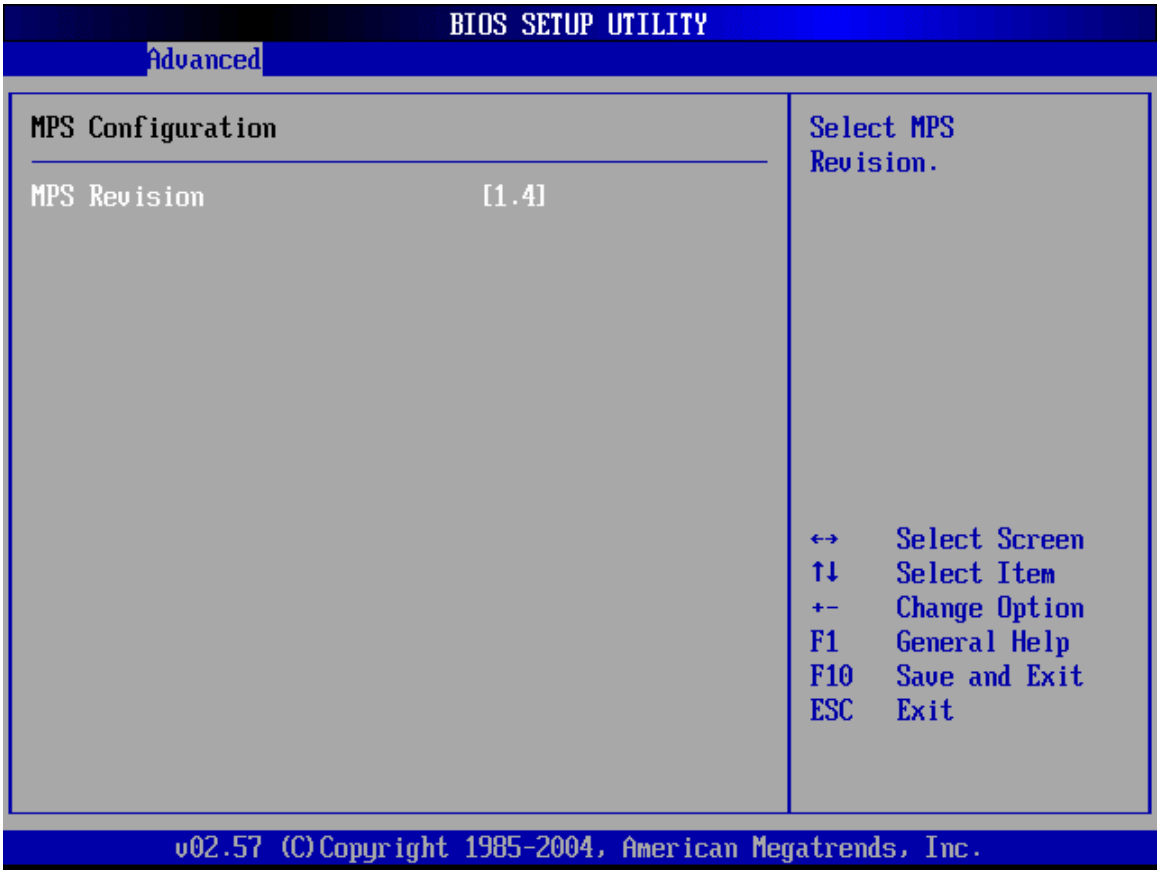
- **Fan Speeds**: The CPU cooling fan speed is monitored.
  - Fan2 Speed

- **Voltages**: The following system voltages are monitored
  - VcoreA
  - GMCH CORE

- +1.5Vin
- +3.30Vin
- +5.00Vin
- +12Vin
- +2.5Vin
- +5VSB

5.3.6 MPS Configuration

The MPS Configuration menu (BIOS Menu 9) configures the multi-processor table.



BIOS Menu 9: MPS Configuration

➔ **MPS Revision [1.1]**

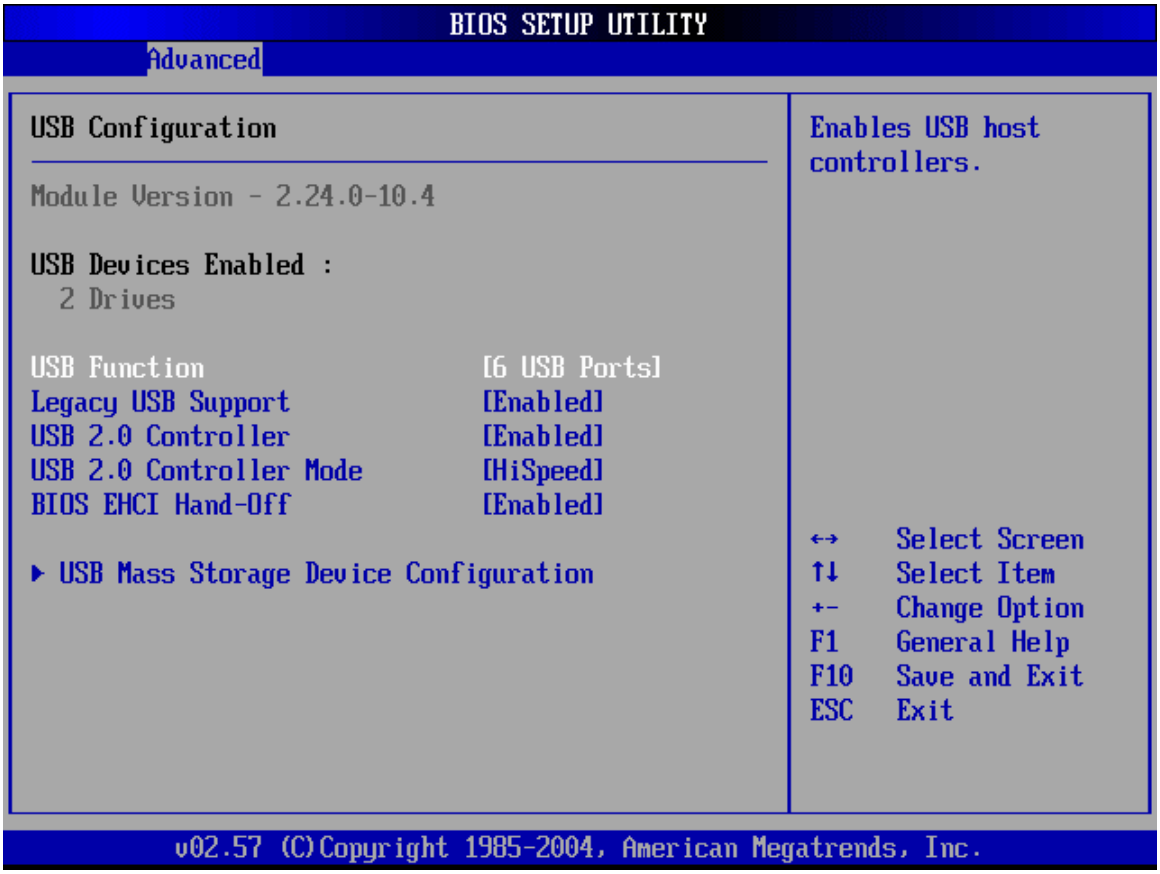
The **Multiprocessor Specification (MPS) for OS** specifies the MPS version to be used.

➔ **1.1** (Default) MPS version 1.1 is used

➔ **1.4** MPS version 1.4 is used

5.3.7 USB Configuration

The **USB Configuration** menu (**BIOS Menu 10**) gives USB configuration information and configures some USB features.



BIOS Menu 10: USB Configuration

➔ **USB Configuration**

The USB Configuration field shows the system USB configuration. The items listed are:

- Module Version: x.xxxxx.xxxxx

➔ **USB Devices Enabled:**

Lists the USB devices that are enabled on the system

➔ **USB Function [Enabled]**

Use the **USB Function** BIOS option to enable or disable the USB function

➔	**Disabled**		USB function disabled
➔	**Enabled**	(Default)	USB function enabled

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔	**Disabled**		Legacy USB support disabled
➔	**Enabled**	**DEFAULT**	Legacy USB support enabled
➔	**Auto**		Legacy USB support disabled if no USB devices are connected

➔ **USB2.0 Controller Mode [HiSpeed]**

Use the **USB2.0 Controller Mode** option to set the speed of the USB2.0 controller.

➔	**FullSpeed**		The controller is capable of operating at 12Mb/s
➔	**HiSpeed**	**DEFAULT**	The controller is capable of operating at 480Mb/s

➔ **BIOS EHCI Handoff [Enabled]**

Use the **BIOS EHCI Handoff** option for systems running OSes that do not have EHCI hand-off support. The EHCI ownership change is managed by the EHCI driver.

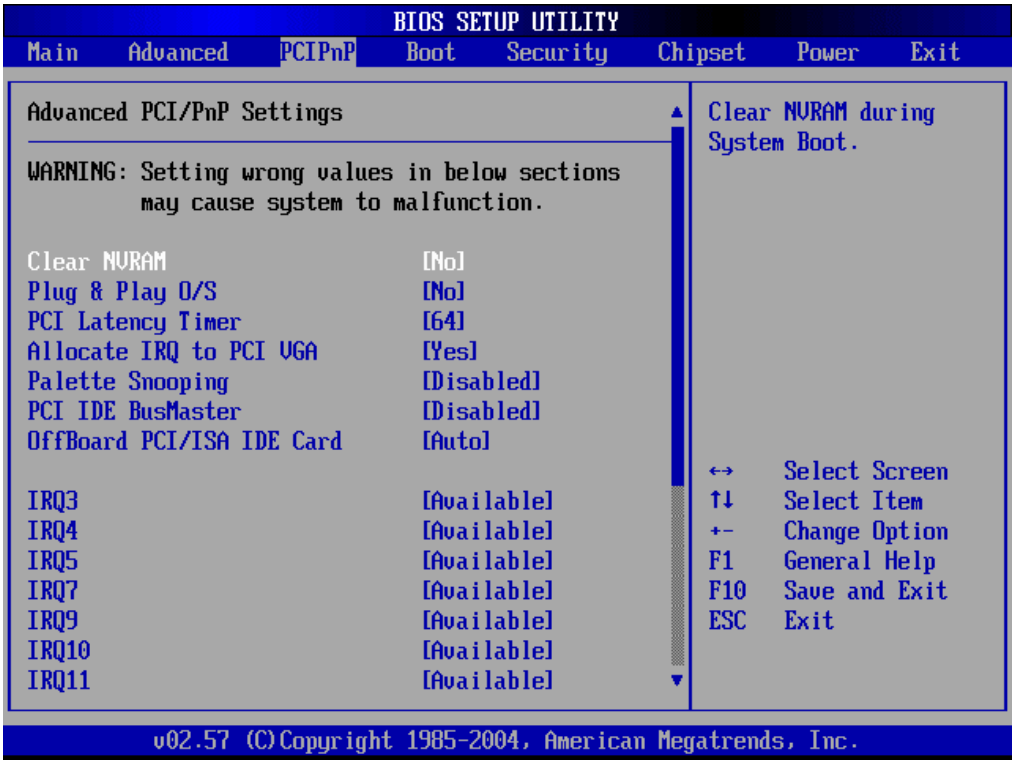
➔ **Disabled**		Systems with OSes that do not support EHCI can use the EHCI handoff functionality.
➔ **Enabled**	**DEFAULT**	Systems with OSes that do not support EHCI cannot use the EHCI handoff functionality.

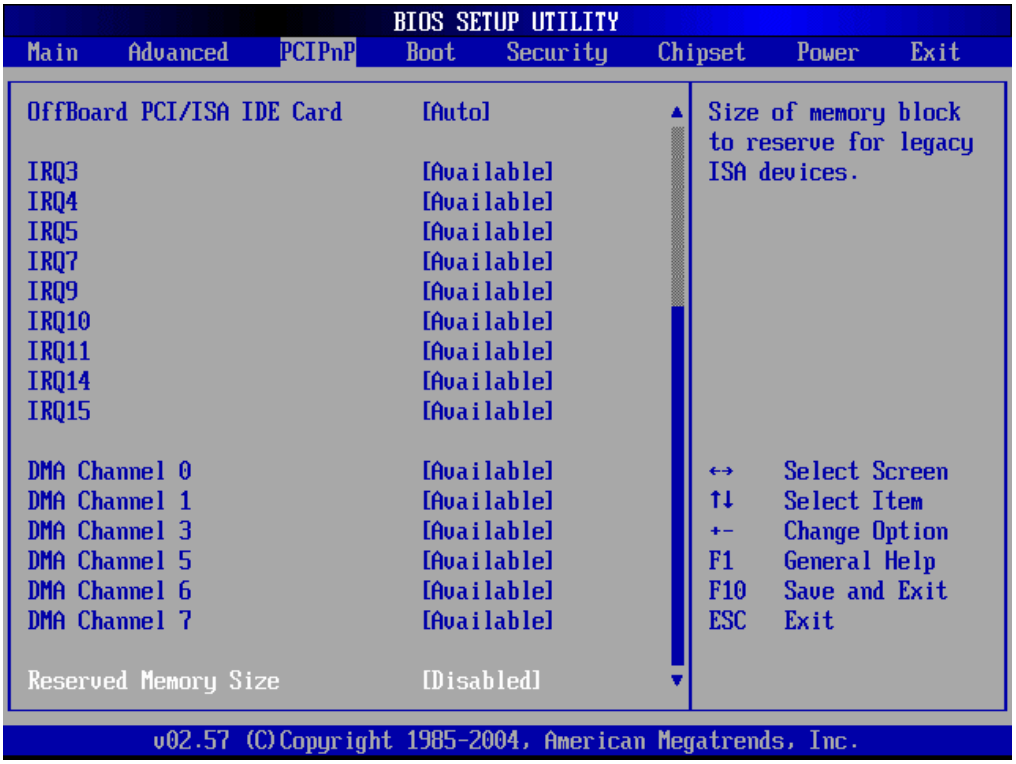
5.4 PCI/PnP

The PCI/PnP menu (BIOS Menu 10) configures advanced PCI and PnP settings.

WARNING!

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.





BIOS Menu 11: PCI/PnP Configuration

➔ **Clear NVRAM [No]**

Use the **Clear NVRAM** option to specify if the NVRAM (Non-Volatile RAM) is cleared when the power is turned off.

➔ **No**	**DEFAULT**	System does not clear NVRAM during system boot
➔ **Yes**		System clears NVRAM during system boot

➔ **Plug & Play O/S [No]**

Use the **Plug & Play O/S** BIOS option to specify whether system plug and play devices are configured by the operating system or the BIOS.

➔ **No**	**DEFAULT**	If the operating system does not meet the Plug and Play specifications, this option allows the BIOS to configure all the devices in the system.
➔ **Yes**		This setting allows the operating system to change the interrupt, I/O, and DMA settings. Set this option if the system is running Plug and Play aware operating systems.

➔ **PCI Latency Timer [64]**

Use the **PCI Latency Timer** option to specify the PCI latency time. The latency time is measured in units of PCI clock cycles for the PCI device latency timer register. Configuration options are:

- 32
- 64 **DEFAULT**
- 96
- 128
- 160
- 192
- 224
- 248

➔ **Allocate IRQ to PCI VGA [Yes]**

Use the **Allocate IRQ to PCI VGA** option to restrict the system from giving the VGA adapter card an interrupt address.

➔ **Yes**	(Default)	Assigns an IRQ to a PCI VGA card if card requests IRQ
➔ **No**		Does not assign IRQ to a PCI VGA card even if the card requests an IRQ

➔ **Palette Snooping [Disabled]**

Use the **Palette Snooping** option to enable or disable the palette snooping function.

➔ **Disabled**	**DEFAULT**	Unless the VGA card manufacturer requires palette snooping to be enabled, this option should be disabled.
➔ **Enabled**		PCI devices are informed that an ISA based Graphics device is installed in the system so the ISA based Graphics card functions correctly. This does not necessarily indicate a physical ISA adapter card. The graphics chipset can be mounted on a PCI card. Always check with the adapter card manual first, before modifying the default settings in the BIOS.

➔ **PCI IDE BusMaster [Disabled]**

Use the **PCI IDE BusMaster** BIOS option to enable or prevent PCI IDE busmastering.

➔ **Disabled**	**DEFAULT**	Busmastering is prevented
➔ **Enabled**		IDE controller on the PCI local bus has mastering capabilities

➔ **OffBoard PCI/ISA IDE Card [Auto]**

Use the OffBoard PCI/ISA IDE Card BIOS option to select the OffBoard PCI/ISA IDE Card.

➔ **Auto**	**DEFAULT**	The location of the Off Board PCI IDE adapter card is automatically detected by the AMIBIOS.
➔ **PCI Slot 1**		PCI Slot 1 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 1.
➔ **PCI Slot 2**		PCI Slot 2 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 2.
➔ **PCI Slot 3**		PCI Slot 3 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 3.
➔ **PCI Slot 4**		PCI Slot 4 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 4.
➔ **PCI Slot 5**		PCI Slot 5 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 5.
➔ **PCI Slot 6**		PCI Slot 6 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 6.

➔ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

➔ **Available** **DEFAULT** The specified IRQ is available to be used by PCI/PnP devices

➔ **Reserved** The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7
- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

➔ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

➔ **Available** **DEFAULT** The specified DMA is available to be used by PCI/PnP devices

➔ **Reserved** The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0
- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

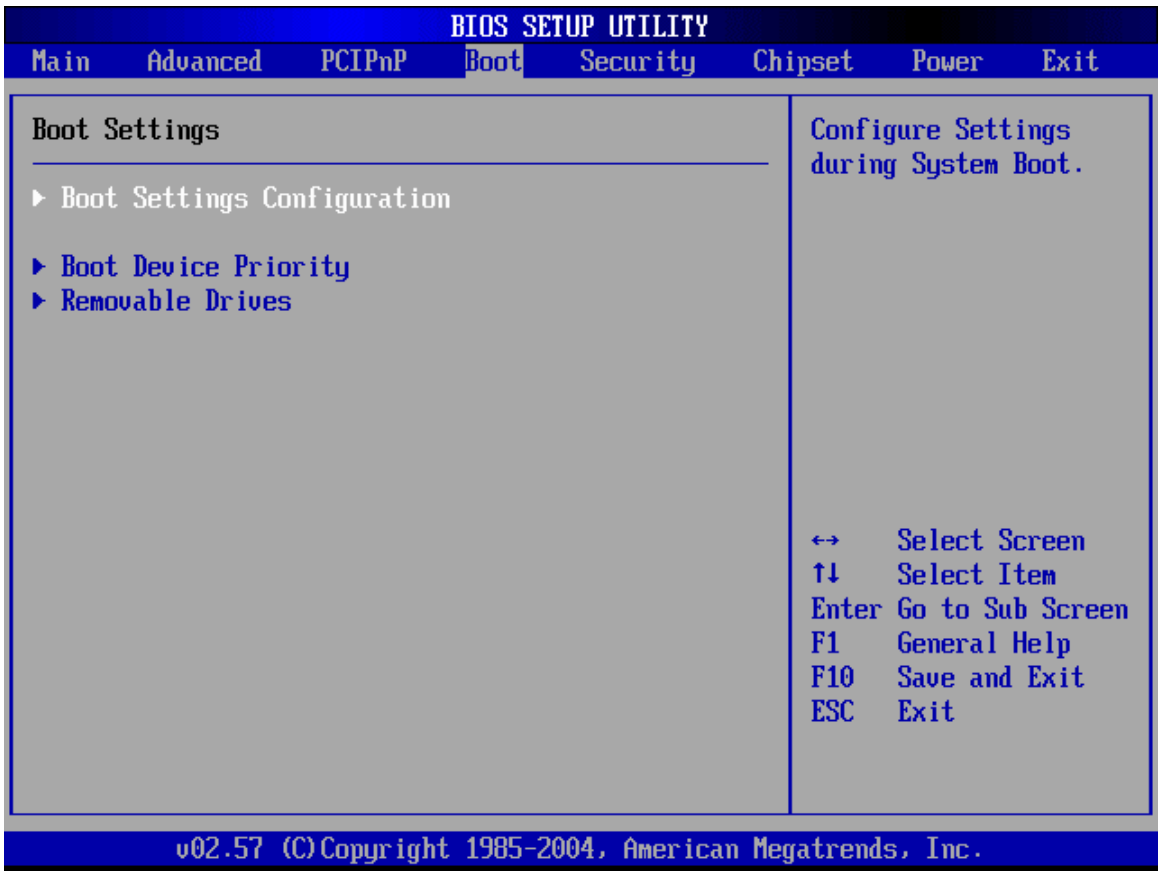
➔ **Reserved Memory Size [Disabled]**

Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

➔	**Disabled**	**DEFAULT**	No memory block reserved for legacy ISA devices
➔	**16K**		16KB reserved for legacy ISA devices
➔	**32K**		32KB reserved for legacy ISA devices
➔	**64K**		54KB reserved for legacy ISA devices

5.5 Boot

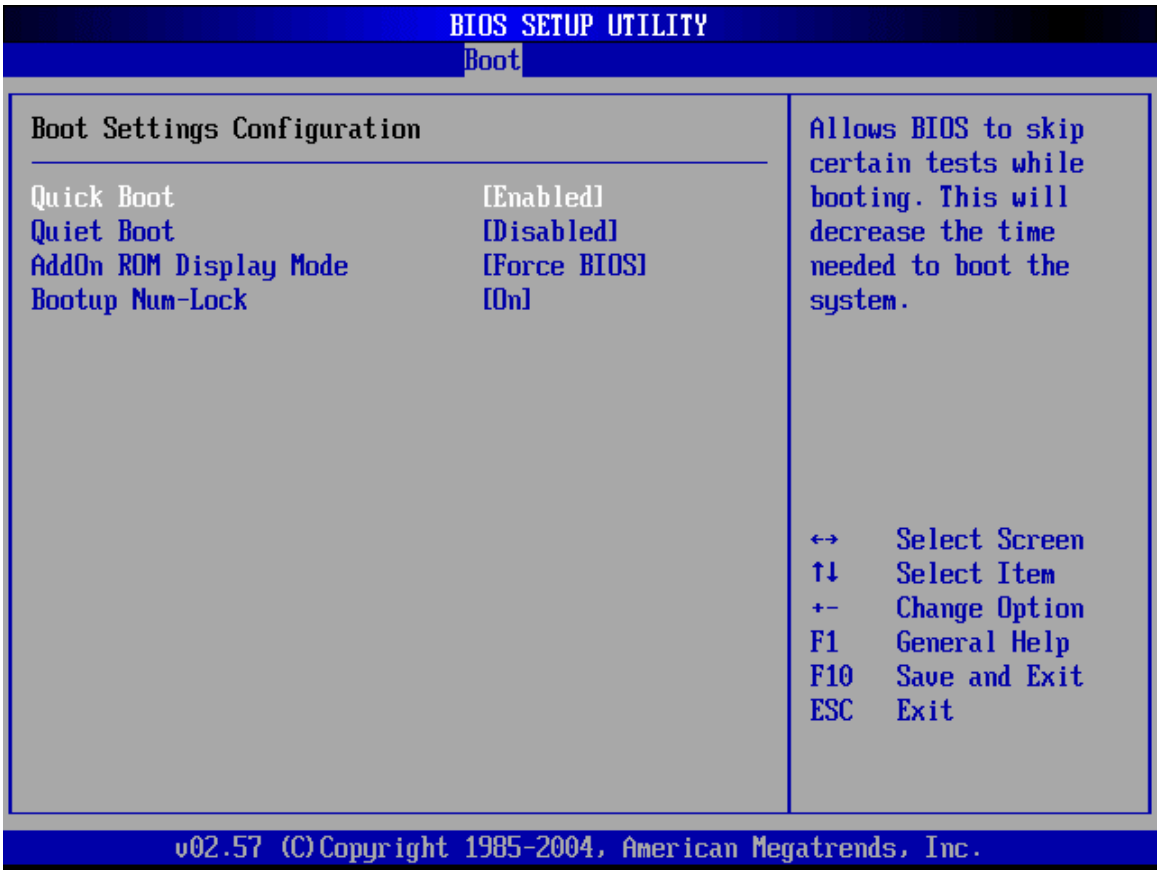
The Boot menu (BIOS Menu 12) configures system boot options.



BIOS Menu 12: Boot

5.5.1 Boot Settings Configuration

The Boot Settings Configuration menu (BIOS Menu 12) configures advanced system boot options.


BIOS SETUP UTILITY
Boot
Boot Settings Configuration
Quick Boot [Enabled]
Quiet Boot [Disabled]
AddOn ROM Display Mode [Force BIOS]
Bootup Num-Lock [On]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
↔ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.57 (C)Copyright 1985-2004, American Megatrends, Inc.

BIOS Menu 13: Boot Settings Configuration

➔ **Quick Boot [Enabled]**

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

➔ **Disabled** No POST procedures are skipped

➔ **Enabled** **DEFAULT** Some POST procedures are skipped to decrease the system boot time

➔ **Quiet Boot [Disabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled**	**DEFAULT**	Normal POST messages displayed
➔ **Enabled**		OEM Logo displayed instead of POST messages

➔ **AddOn ROM Display Mode [Force BIOS]**

Use the **AddOn ROM Display Mode** option to allow add-on ROM (read-only memory) messages to be displayed.

➔ **Force BIOS**	**DEFAULT**	The system forces third party BIOS to display during system boot.
➔ **Keep Current**		The system displays normal information during system boot.

➔ **Bootup Num-Lock [On]**

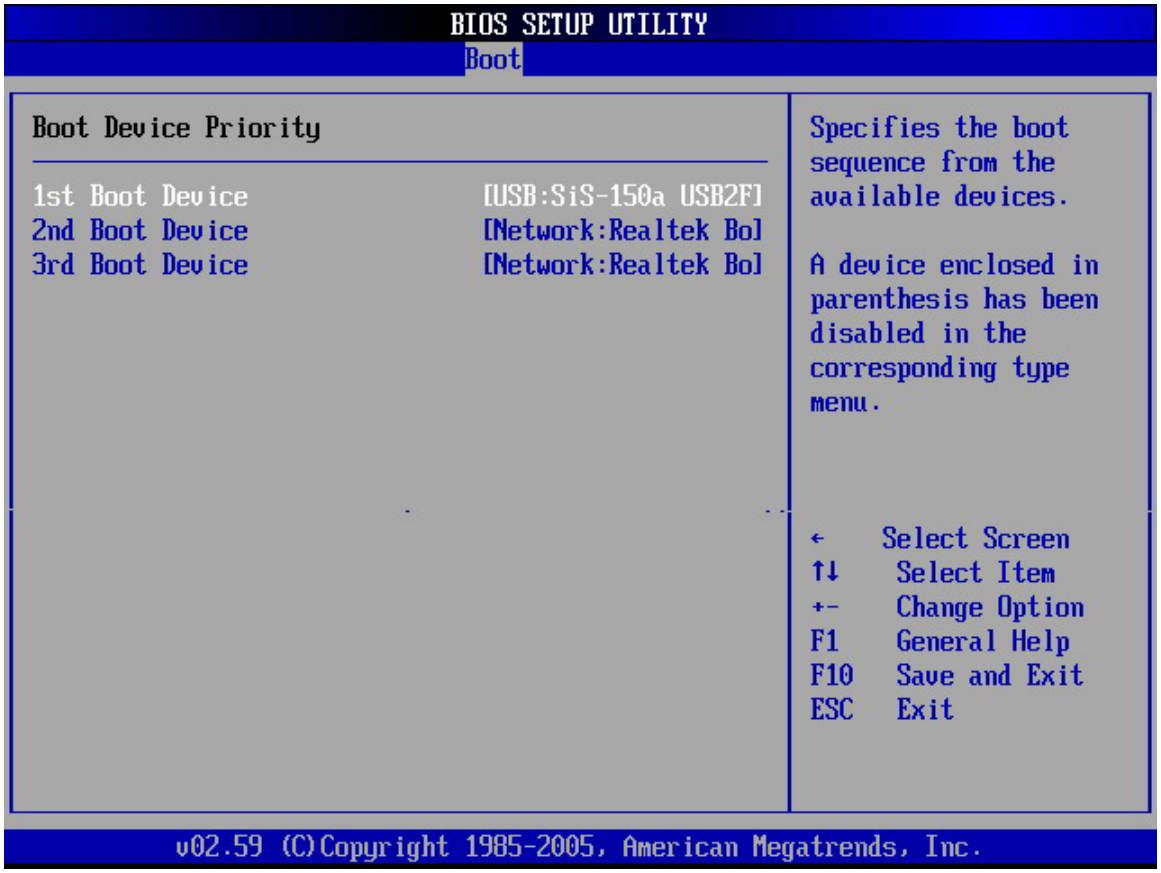
Use the **Bootup Num-Lock** BIOS option to specify if the number lock setting must be modified during boot up.

➔ **Off**		Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.
➔ **On**	**DEFAULT**	Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

5.5.2 Boot Device Priority

The **Boot Device Priority** menu (**BIOS Menu 14**) specifies the boot sequence from the available devices. Possible boot devices may include:

- 1st FLOPPY DRIVE
- HDD
- CD/DVD


BIOS SETUP UTILITY
Boot
Boot Device Priority
1st Boot Device [USB:SiS-150a USB2F]
2nd Boot Device [Network:Realtek Bo]
3rd Boot Device [Network:Realtek Bo]
Specifies the boot sequence from the available devices.
A device enclosed in parenthesis has been disabled in the corresponding type menu.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.59 (C)Copyright 1985-2005, American Megatrends, Inc.

BIOS Menu 14: Boot Device Priority Settings

5.5.3 Hard Disk Drives

The **Hard Disk Drives** menu is similar to the **Removable Drives BIOS Menu 15** and it specifies the boot sequence of the available HDDs. When the menu is opened, the HDDs connected to the system are listed as shown below:

- 1st Drive [HDD: PM-(part number)]
- 2nd Drive [HDD: PS-(part number)]
- 3rd Drive [HDD: SM-(part number)]
- 4th Drive [HDD: SM-(part number)]
-

NOTE:

Only the drives connected to the system are shown. For example, if only two HDDs are connected only "**1st Drive**" and "**2nd Drive**" are listed.

The boot sequence from the available devices is selected. If the "**1st Drive**" option is selected a list of available HDDs is shown. Select the first HDD system boots from. If the "**1st Drive**" is not used for booting this option may be disabled.

5.5.4 Removable Drives

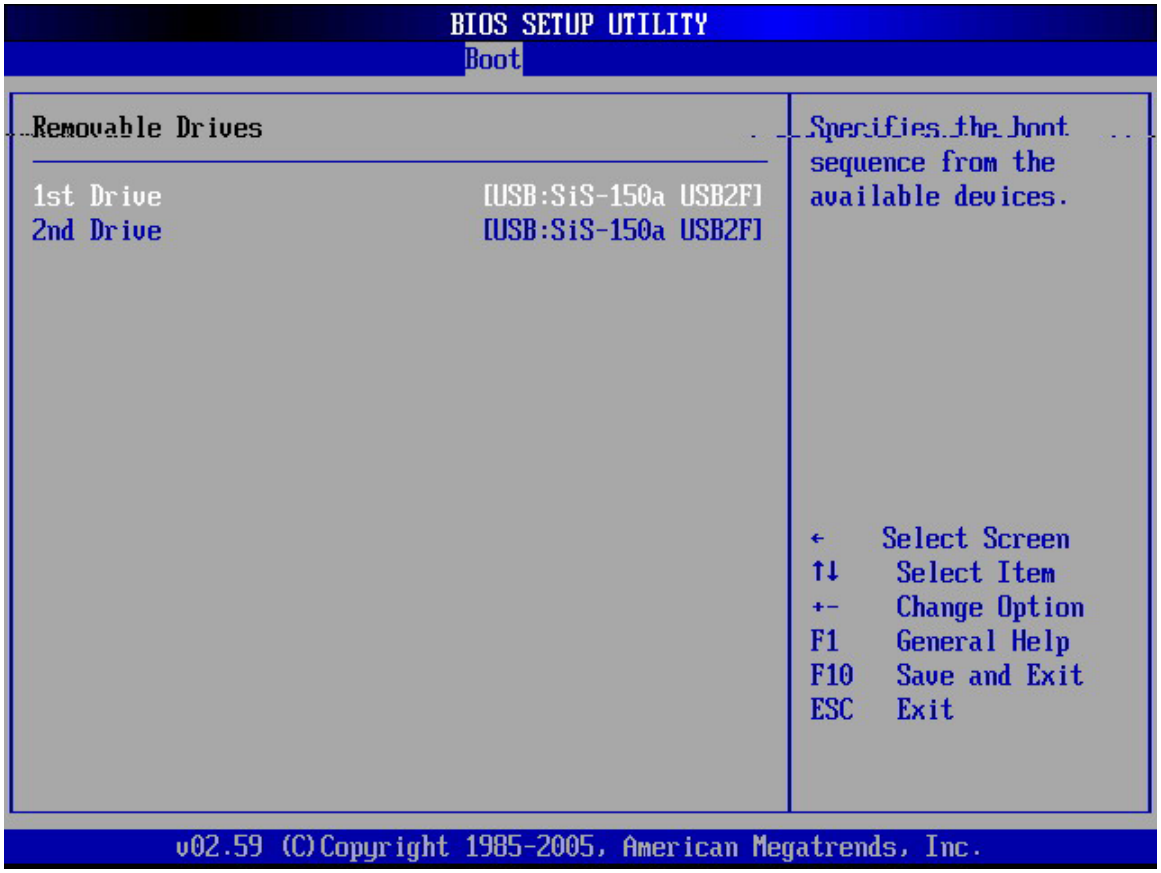
The **Removable Drives** menu (**BIOS Menu 15**) specifies the boot sequence of the available FDDs. When the menu is opened, the FDDs connected to the system are listed as shown below:

- 1st Drive [1st FLOPPY DRIVE]
- 2nd Drive [2nd FLOPPY DRIVE]

NOTE:

Only the drives connected to the system are shown. For example, if only one FDD is connected only "**1st Drive**" is listed.

The boot sequence from the available devices is selected. If the "**1st Drive**" option is selected a list of available FDDs is shown. Select the first FDD system boots from. If the "**1st Drive**" is not used for booting this option may be disabled.



BIOS Menu 15: Removable Drives

5.5.5 CD/DVD Drives

The **CD/DVD Drives** menu is similar to the **Removable Drives BIOS Menu 15** and it specifies the boot sequence of the available CD/DVD drives. When the menu is opened, the CD drives and DVD drives connected to the system are listed as shown below:

- 1st Drive [CD/DVD: PM-(part ID)]
- 2nd Drive [HDD: PS-(part ID)]
- 3rd Drive [HDD: SM-(part ID)]
- 4th Drive [HDD: SM-(part ID)]
-

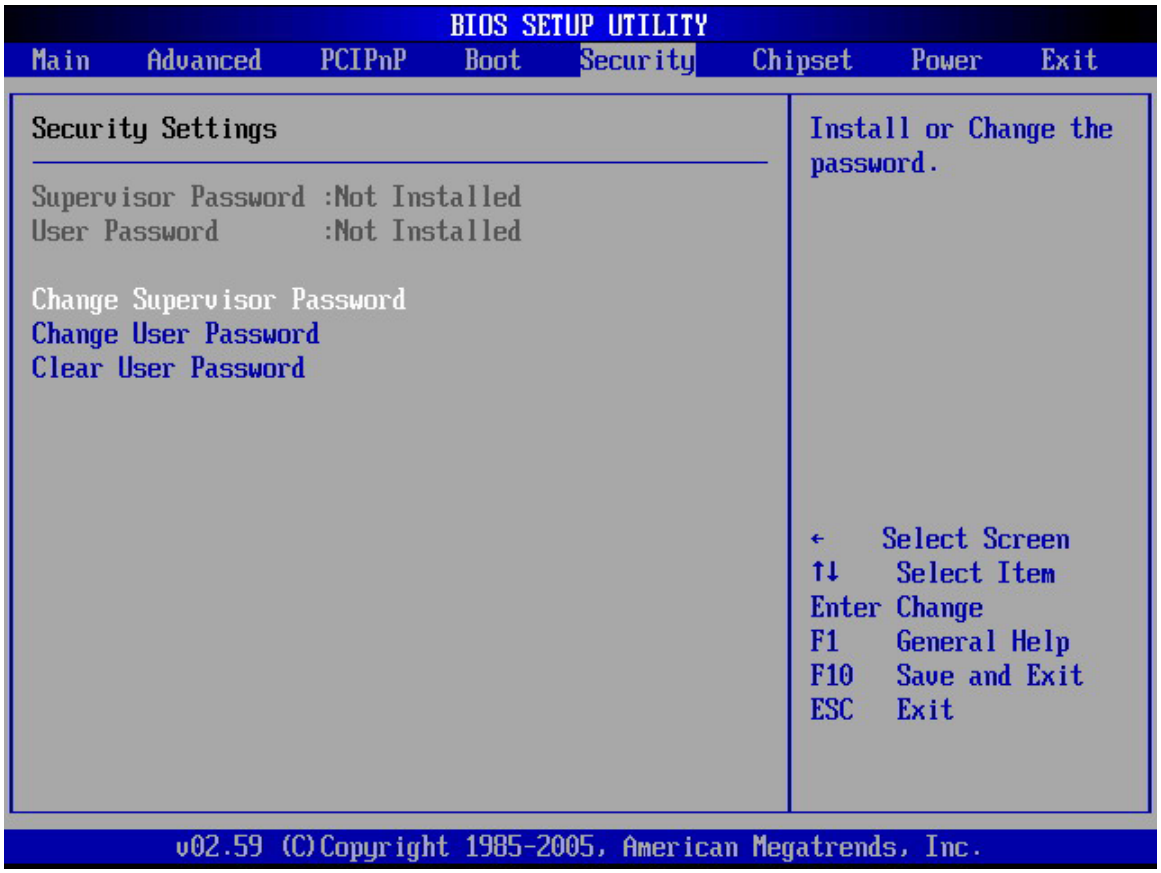
NOTE:

Only the drives connected to the system are shown. For example, if only two CDs or DVDs are connected only "**1st Drive**" and "**2nd Drive**" are listed.

The boot sequence from the available devices is selected. If the "**1st Drive**" option is selected a list of available CD/DVD drives is shown. Select the first CD/DVD drive the system boots from. If the "**1st Drive**" is not used for booting this option may be disabled.

5.6 Security

The **Security** menu (**BIOS Menu 16**) allows system security settings including passwords to be configured.



BIOS Menu 16: Security

➔ **Change Supervisor Password**

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

➔ **Change User Password**

Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

5.7 Chipset

The Chipset menu (**BIOS Menu 17**) has two sub-menus, **NorthBridge** and **SouthBridge**. The **NorthBridge Configuration** menu configures the northbridge chipset and the **SouthBridge Configuration** menu configures the southbridge chipset.

WARNING!

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Power Exit
Advanced Chipset Settings
WARNING: Setting wrong values in below sections may cause system to malfunction.
NorthBridge Configuration
SouthBridge Configuration
Options for NB
↔ Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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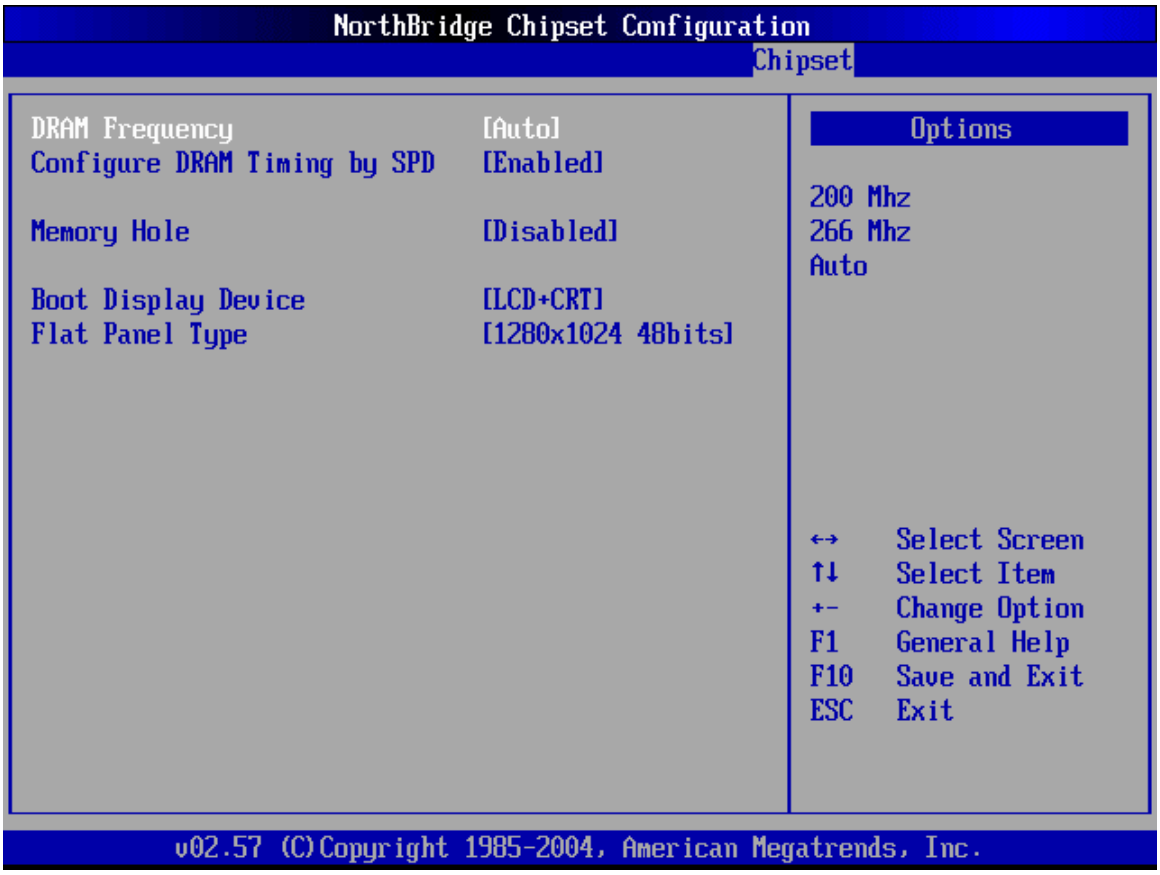
BIOS Menu 17: Chipset

5.7.1 Northbridge Configuration

The Northbridge Configuration menu (BIOS Menu 17) allows the northbridge chipset to be configured.



BIOS Menu 18:NorthBridge Chipset Configuration

➔ **DRAM Frequency [Auto]**

Use the **DRAM Frequency** option to specify the DRAM frequency or allow the system to automatically detect the DRAM frequency.

➔ **200MHz** Sets the DRAM frequency to 200MHz

➔ **266MHz** Sets the DRAM frequency to 266MHz

➔ **Auto** **DEFAULT** Automatically selects the DRAM frequency

➔ **Configure DRAM Timing by SPD [Enabled]**

Use the **Configure DRAM Timing by SPD** option to determine if the system uses the SPD *(*Serial Presence Detect) EEPROM to configure the DRAM timing. The SPD EEPROM contains all necessary DIMM specifications including the speed of the individual components such as CAS and bank cycle time as well as valid settings for the module and the manufacturer's code. The SPD enables the BIOS to read the spec sheet of the DIMMs on boot-up and then adjust the memory timing parameters accordingly.

➔ **Disabled** DRAM timing parameters are manually set using the DRAM sub-items

➔ **Enabled** **DEFAULT** DRAM timing parameter are set according to the DRAM Serial Presence Detect (SPD)

If the **Configure DRAM Timing by SPD** option is disabled, the following configuration options appear.

- DRAM CAS# Latency [3]
- DRAM RAS# to CAS# Delay [5 DRAM Clocks]
- DRAM RAS# Precharge [5 DRAM Clocks]
- DRAM RAS# Activate to Precha [15 DRAM Clocks]

➔ **Memory Hole [Disabled]**

Use the **Memory Hole** option to reserve memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If an older ISA expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

➔ **Disabled** **DEFAULT** Memory is not reserved for ISA expansion cards

➔ **15MB – 16MB** Between 15MB and 16MB of memory is reserved for ISA expansion cards

➔ **Boot Display Device [Auto]**

The **Boot Display Device** BIOS option selects the display device the system uses when it boots. The available options are listed below:

- Auto (Default)
- CRT on Port 0
- LFP on Port 2
- LFP on Port 3
- DFP on Port 2
- DFP on Port 3
- TV on Port 2
- TV on Port 3
- CRT-Port 0 & CRT-Port 2
- CRT-Port 0 & CRT-Port 3
- CRT-Port 0 & LFP-Port 2
- CRT-Port 0 & LFP-Port 3
- CRT-Port 0 & DFP-Port 2
- CRT-Port 0 & DFP-Port 3
- DFP-Port 2 & DFP-Port 3

➔ **Flat Panel Type [640x480 18bit LVDS]**

The **Flat Panel Type** BIOS option specifies the flat panel PC type being used.

NOTE:

Please refer to the technical documents that came with the flat panel PC to ensure the correct settings are selected.

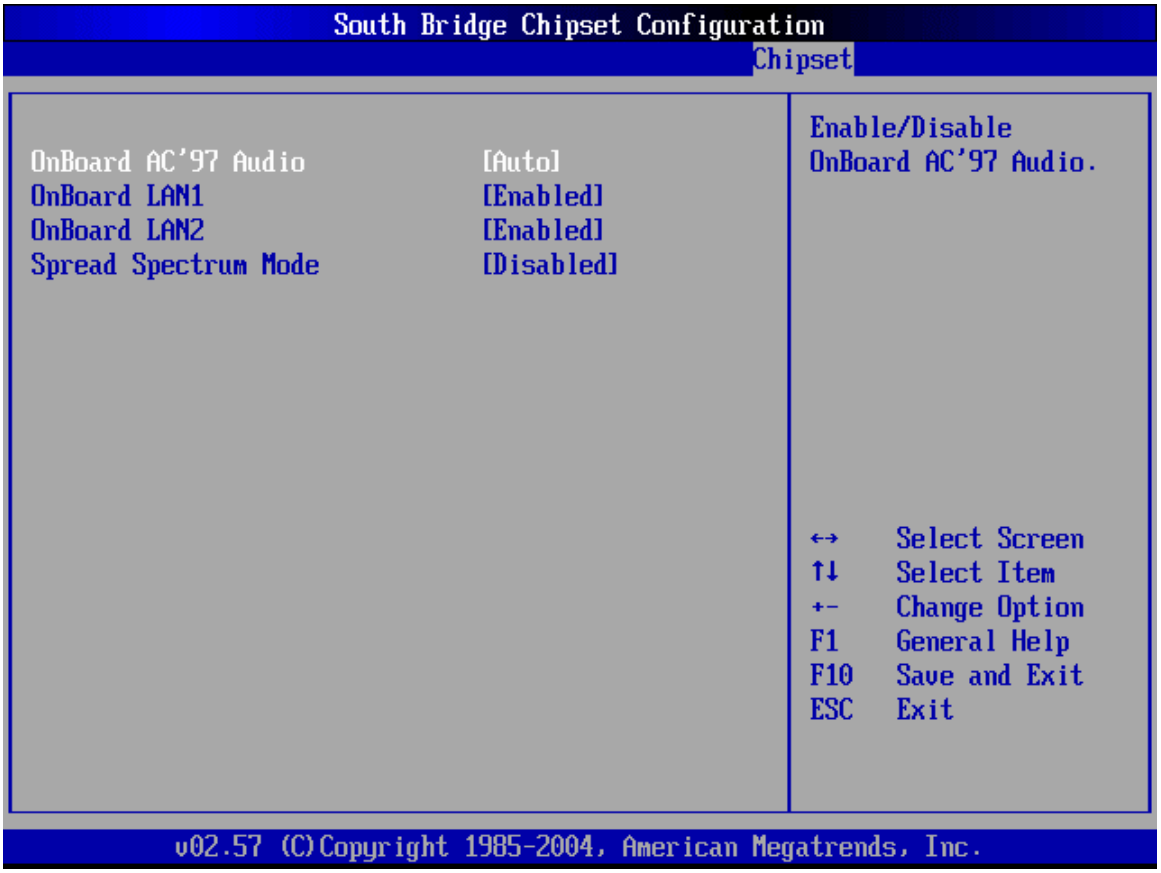
The following options are available:

- 640x480 LVDS (Default)
- 800x600 LVDS
- 1024x768 24bit LVDS
- 1280x1024 LVDS

- 1024x768 18 bit LVDS
- 1600x1200 LVDS
- 800x600 24bit LVDS
- 800x600 18bit LVDS
- 1024x768 36bit LVDS
- Type 12
- Type 13
- Type 14
- Type 15
- Type 16

5.7.2 SouthBridge Configuration

The **SouthBridge SiS964 Configuration** menu (BIOS Menu 19) the southbridge chipset to be configured.



BIOS Menu 19:SouthBridge Chipset Configuration

➔ **OnBoard AC97 Audio DEVICE**

The **OnBoard AC97 Audio DEVICE** option enables or disables the AC'97 CODEC.

➔ **Auto**	**DEFAULT**	The onboard AC'97 automatically detected and enabled
➔ **Disabled**		The onboard AC'97 is disabled

➔ **OnBoard LAN1 [Enabled]**

The **OnBoard LAN1** option enables or disables the onboard LAN1.

➔ **Enabled**	(Default)	The onboard LAN1 is device automatically detected and enabled
➔ **Disabled**		Onboard LAN2 is device manually disabled

➔ **OnBoard LAN2 [Enabled]**

The **OnBoard LAN2** option enables or disables the onboard LAN1.

➔ **Enabled**	(Default)	The onboard LAN2 is device automatically detected and enabled
➔ **Disabled**		Onboard LAN2 is device manually disabled

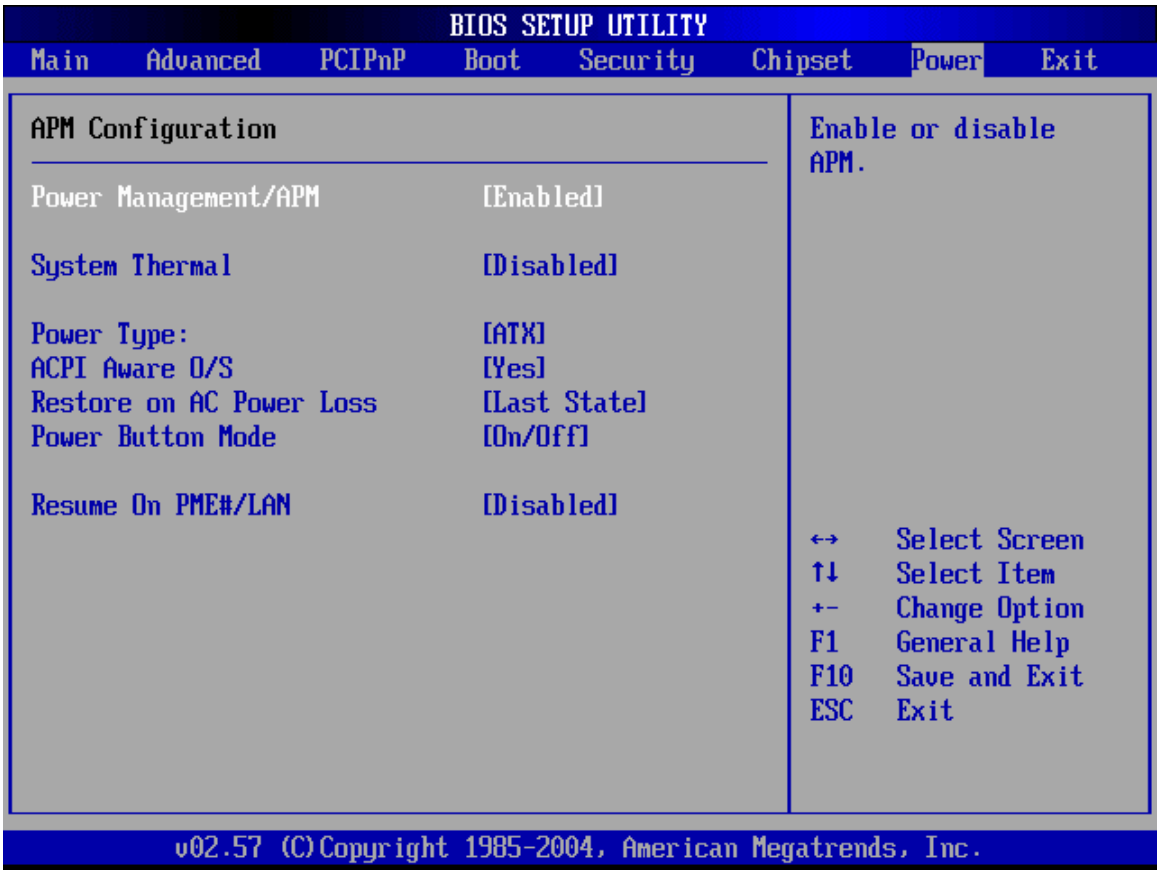
➔ **Spread Spectrum**

Use the **Spread Spectrum** BIOS option to improve CPU EMI issues.

➔ **Disabled**	**DEFAULT**	The clock spread spectrum is disabled
➔ **Enabled**		The clock spread spectrum is enabled

5.8 Power Key

The **Power** menu (**BIOS Menu 20**) allows the advanced power management options to be configured.



BIOS Menu 20:Power

➔ **Power Management/APM [Enabled]**

The **Power Management/APM** BIOS option allows access to the advanced power management features. If this option is disabled, the only other option on the screen is the "**Resume On RTC Alarm**."

➔ **Disabled** Disables the Advanced Power Management (APM)

feature

➔ **Enabled** (Default) Enables the APM feature

➔ **System Thermal [Disabled]**

The **System Thermal** BIOS option enables the manual setting of the **Thermal Active Temperature** and the **THRM throttle Ratio** BIOS options.

➔ **Disabled** **DEFAULT** **Thermal Active Temperature** and the **THRM throttle Ratio** BIOS options cannot be set manually.

➔ **Enabled** **Thermal Active Temperature** and the **THRM throttle Ratio** BIOS options can be set manually.

➔ **Power Type [ATX]**

Use the **Power Type** option to specify the power supply used on the system.

➔ **ATX** **DEFAULT** ATX power type selected

➔ **AT** AT power supply type

➔ **ACPI Aware O/S [Yes]**

Use the **ACPI Aware O/S** option to enable the system to configure ACPI power saving options. ACPI can only be implemented if the system OS complies with the ACPI standard. Windows 98, Windows 2000, and Windows XP all comply with ACPI.

➔ **No** Disables the ACPI support for the OS. This selection should be disabled if the OS does not support ACPI

➔ **Yes** **DEFAULT** Enables the ACPI support for the operating system. This selection should be enabled if the OS does support ACPI

➔ **Restore on AC Power Loss [Last State]**

Use the **Restore on AC Power Loss** option to specify what state the system returns to if there is a sudden loss of power to the system.

➔ **Power Off**		The system remains turned off
➔ **Power On**		The system turns on
➔ **Last State**	(Default)	The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

➔ **Power Button Mode [On/Off]**

The **Power Button Mode** BIOS specifies how the power button functions.

➔ **On/Off**	(Default)	When the power button is pressed the system is either turned on or off
➔ **Standby**		When the power button is pressed the system goes into standby mode
➔ **Suspend**		When the power button is pressed the system goes into suspend mode

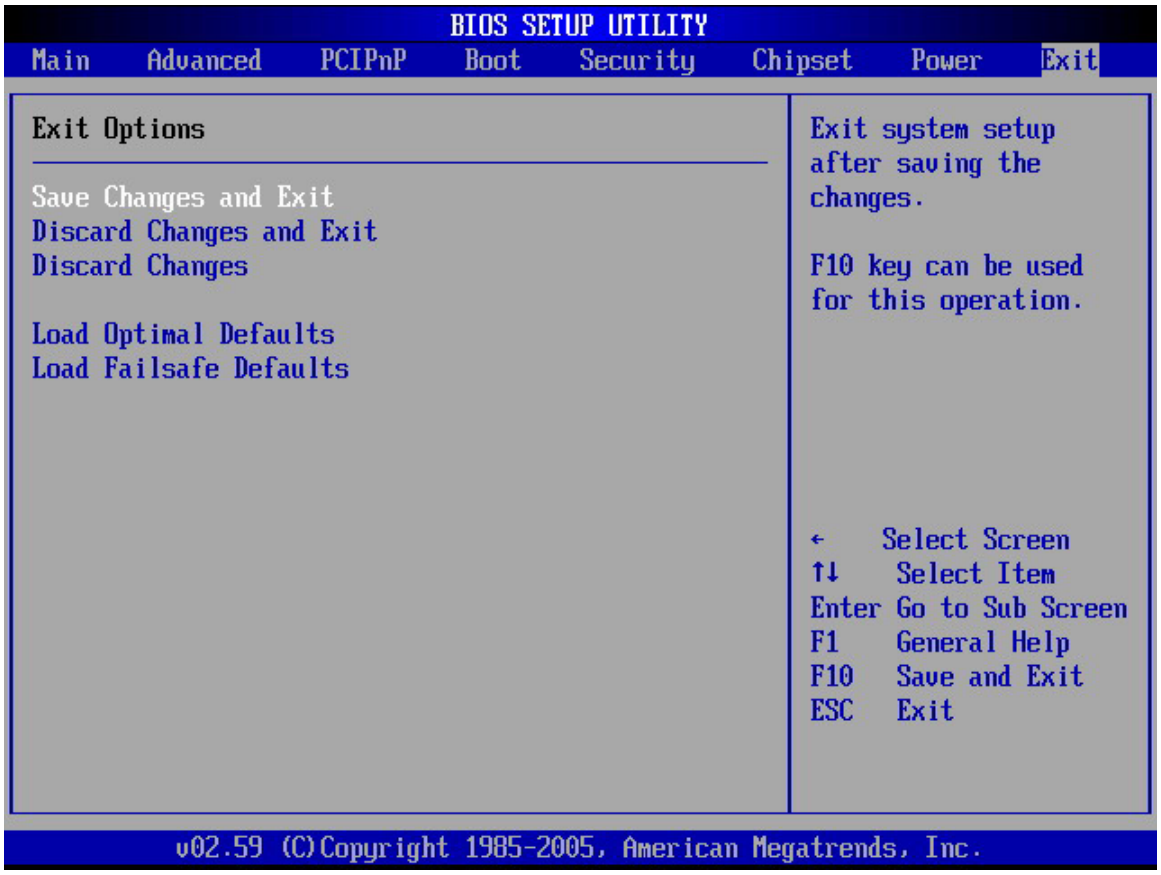
➔ **Restore on PME#/LAN [Disabled]**

The **Restore on PME#/LAN** BIOS option specifies if the system is roused from a suspended or standby state when there is activity on the PCI PME (power management event) controller or the LAN.

➔ **Disabled**	(Default)	Wake event not generated by PCI PME controller or LAN activity
➔ **Enabled**		Wake event generated by PCI PME controller or LAN activity

5.9 Exit

The **Exit** menu (**BIOS Menu 21**) loads default BIOS values, optimal failsafe values and to save configuration changes.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Power Exit
Exit Options
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load Optimal Defaults
Load Failsafe Defaults
Exit system setup after saving the changes.
F10 key can be used for this operation.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
v02.59 (C)Copyright 1985-2005, American Megatrends, Inc.

BIOS Menu 21:Exit

➔ **Save Changes and Exit**

If configuration changes are complete, select this option to save them and exit the BIOS menus.

➔ **Discard Changes and Exit**

If configuration changes are complete but do need to be saved, select this option to exit the BIOS menus.

➔ **Discard Changes**

If configuration changes are complete but do need to be saved but BIOS still needs to be run , select this option.

➔ **Load Optimal Defaults**

This option loads optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

➔ **Load Failsafe Defaults**

This option loads failsafe default values for each of the parameters on the Setup menus. **F8 key can be used for this operation.**

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Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

The contents of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The NOVA-8522G2 board has five software drivers:

- Chipset
- Audio
- LAN
- VGA
- SATA

All five drivers can be found on the CD that came with the NOVA-8522G2. To install the drivers please follow the instructions in the sections below

6.2 Chipset Driver Installation

To install the chipset driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the NOVA-8522G2 board. Open the **Chipset/852GM** directory and locate the icon for the **Setup** installation file. Once located, use the mouse to double click the icon.

Step 2: The “InstallShield Wizard Preparation Screen” in **Figure 6-1** appears.

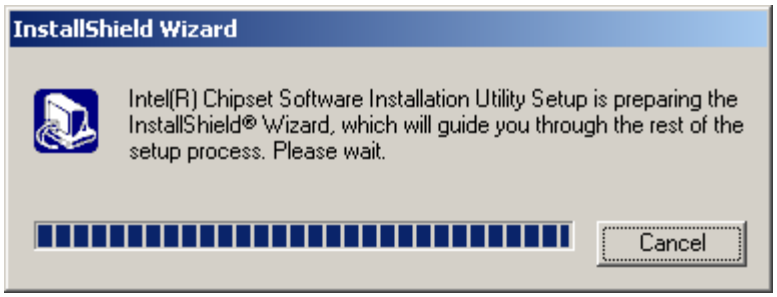
InstallShield Wizard
Intel(R) Chipset Software Installation Utility Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

Figure 6-1: InstallShield Wizard Preparation Screen

Step 1: The “Welcome” window in **Figure 6-2** appears next.

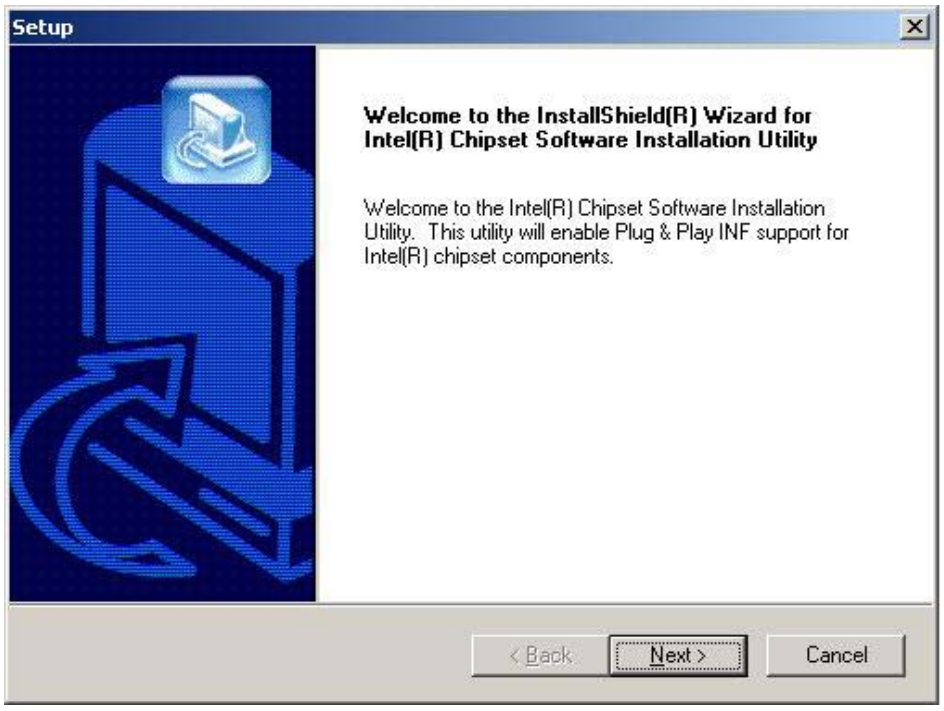
Setup
Welcome to the InstallShield(R) Wizard for Intel(R) Chipset Software Installation Utility
Welcome to the Intel(R) Chipset Software Installation Utility. This utility will enable Plug & Play INF support for Intel(R) chipset components.
< Back
Next >
Cancel

Figure 6-2: Welcome Screen

Step 2: Click “**Next**” and the license agreement shown in **Figure 6-3** appears.

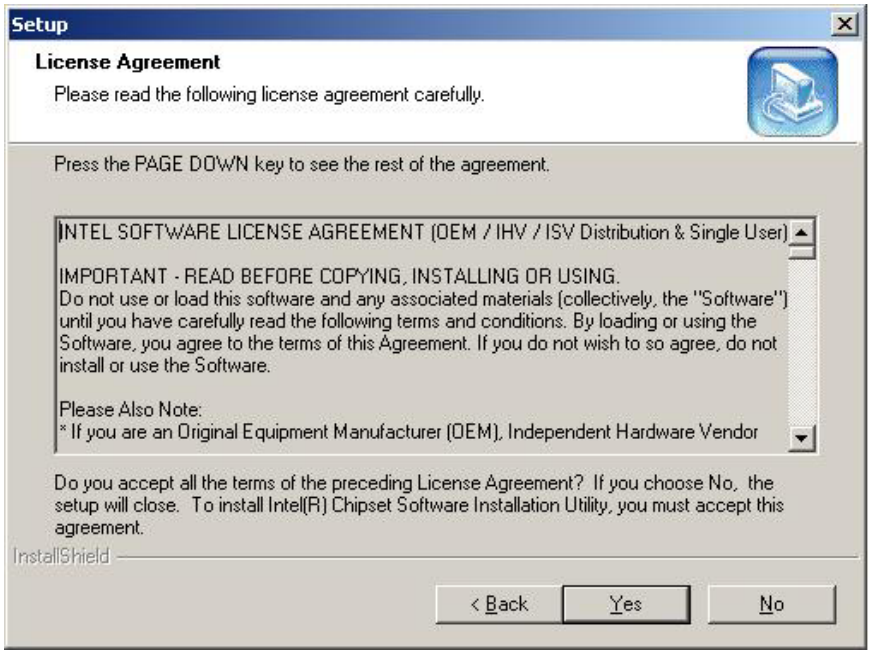
Setup
License Agreement
Please read the following license agreement carefully.
Press the PAGE DOWN key to see the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor
Do you accept all the terms of the preceding License Agreement? If you choose No, the setup will close. To install Intel(R) Chipset Software Installation Utility, you must accept this agreement.
InstallShield
< Back
Yes
No

Figure 6-3: License Agreement

Step 3: Agree to the license terms by clicking "**Yes**". The "**Readme**" in **Figure 6-4** appears.

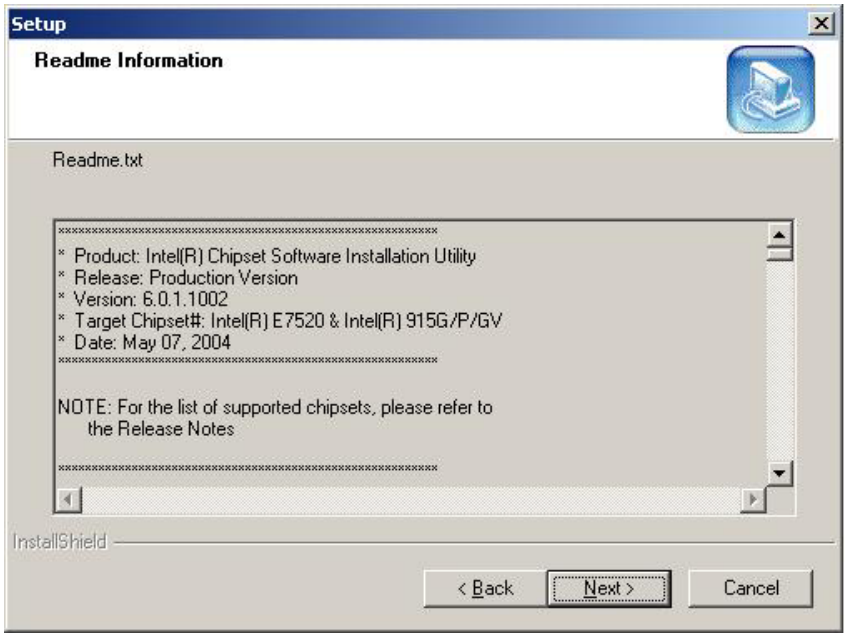
Setup
Readme Information
Readme.txt
* Product: Intel(R) Chipset Software Installation Utility
* Release: Production Version
* Version: 6.0.1.1002
* Target Chipset#: Intel(R) E7520 & Intel(R) 915G/P/GV
* Date: May 07, 2004
NOTE: For the list of supported chipsets, please refer to the Release Notes
InstallShield
< Back
Next >
Cancel

Figure 6-4: Readme Information

Step 4: Click "**Yes**". The driver is installed on the computer. After the installation is complete, the installation complete screen shown in **Figure 6-5** appears. Select the preferred option and click "**Finish**" to complete the installation process.

Setup
InstallShield(R) Wizard Complete
The InstallShield(R) Wizard has successfully installed Intel(R) Chipset Software Installation Utility. Before you can use the program, you must restart your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
< Back
Finish
Cancel

Figure 6-5: Restart the Computer

6.3 RealTek Audio Driver Installation

To install the RealTek AC'97 Audio driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the NOVA-8522G2 board. Open the CD folder and locate the **AUDIO DRIVER A3.79** directory. Open the directory and look for icon for the **setup.exe** installation file. Once located, use the mouse to double click the icon.

Step 2: Once double clicking the **Setup** icon, the install shield wizard for the audio driver starts. See **Figure 6-6.**

Figure 6-6: Audio Driver Install Shield Wizard Starting

Step 3: The RealTek Audio Setup prepares the install shield to guide through the rest of the setup process. See **Figure 6-7**.

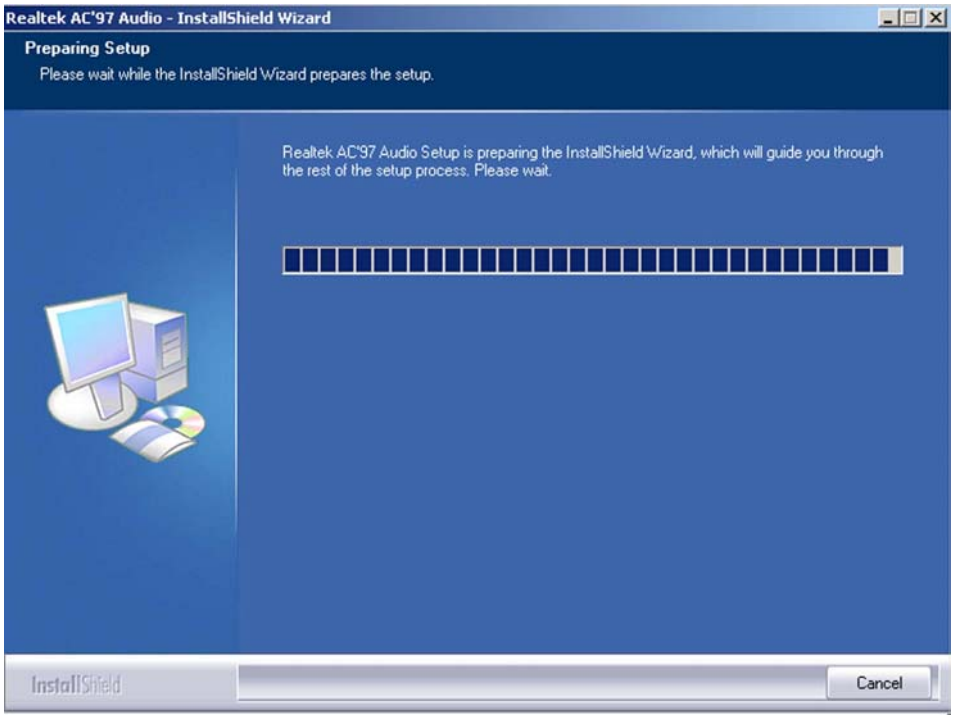
Realtek AC'97 Audio - InstallShield Wizard
Preparing Setup
Please wait while the InstallShield Wizard prepares the setup.
Realtek AC'97 Audio Setup is preparing the InstallShield Wizard, which will guide you through the rest of the setup process. Please wait.
InstallShield
Cancel

Figure 6-7: Audio Driver Setup Preparation

Step 4: After install shield is prepared, the welcome screen shown in **Figure 6-8** appears. To continue the installation process, click the "**Next**" button. The install shield starts to configure the new software as shown in **Figure 6-9**.

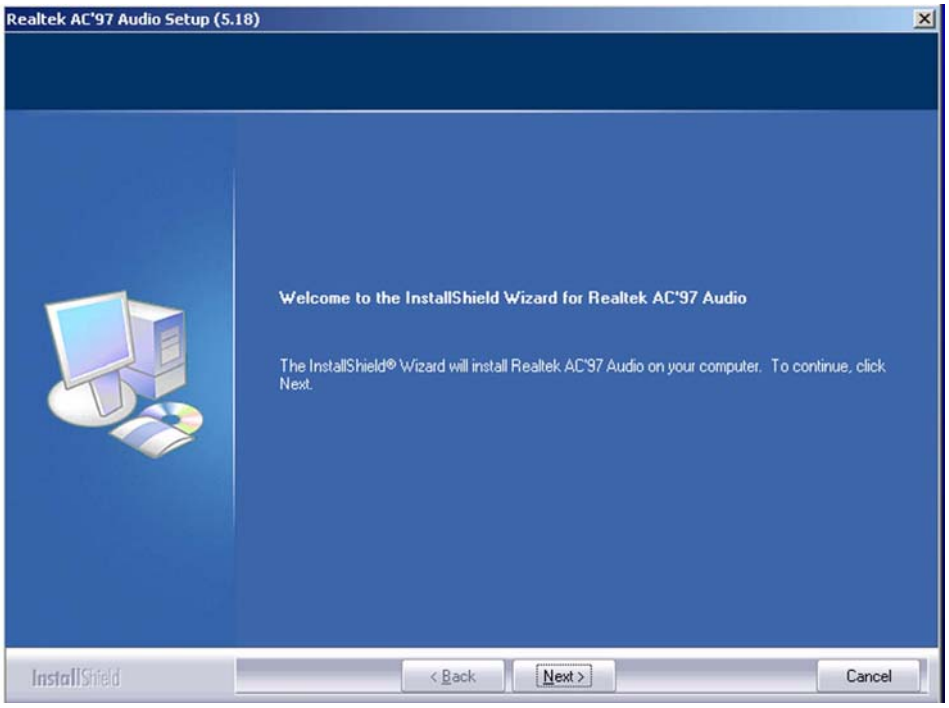
Realtek AC'97 Audio Setup (5.18)
Welcome to the InstallShield Wizard for Realtek AC'97 Audio
The InstallShield® Wizard will install Realtek AC'97 Audio on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

Figure 6-8: Audio Driver Welcome Screen

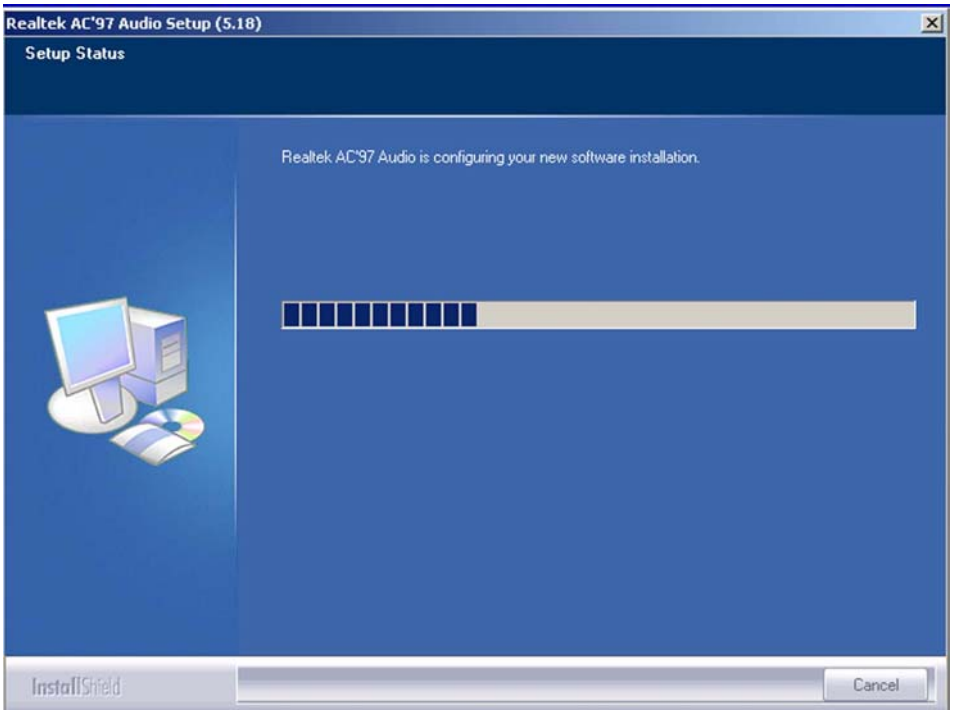

Figure 6-9: Audio Driver Software Configuration

Step 5: At this stage the "**Digital Signal Not Found**" screen shown in **Figure 6-10**

appears. To continue the installation process, click the “**Yes**” button. The installation notice shown below appears.

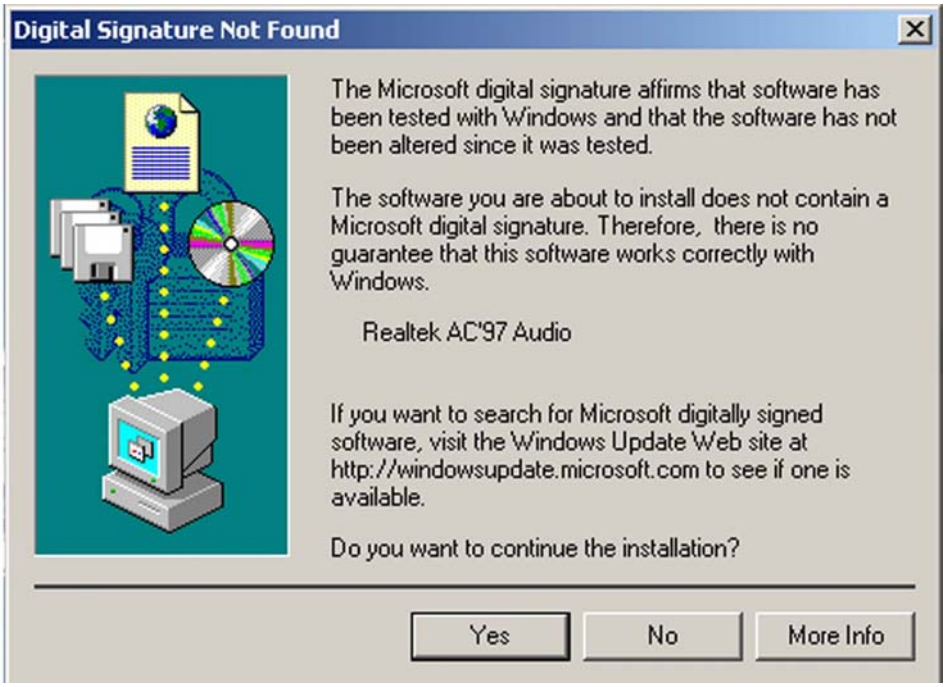
Digital Signature Not Found
The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.
Realtek AC'97 Audio
If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.
Do you want to continue the installation?
Yes
No
More Info

Figure 6-10: Audio Driver Digital Signal

Step 6: At this stage the clicking the “**Yes**” button in **Figure 6-10** appears, the installation of the driver begins. See **Figure 6-11**.

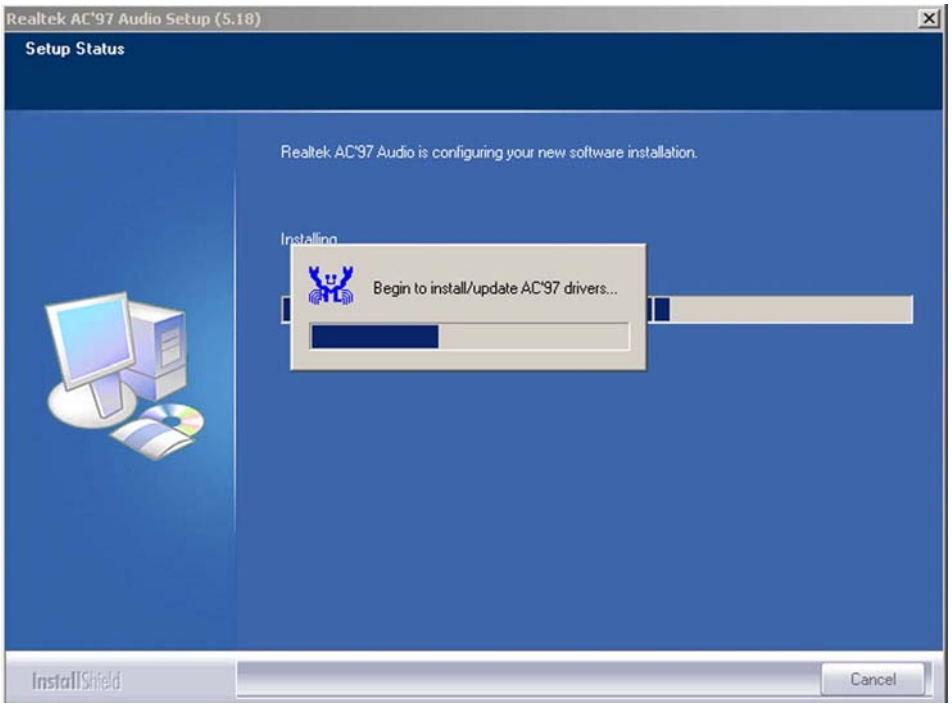

Figure 6-11: Audio Driver Installation Begins

Step 7: After the driver installation process is complete, a confirmation screen shown in **Figure 6-12** appears

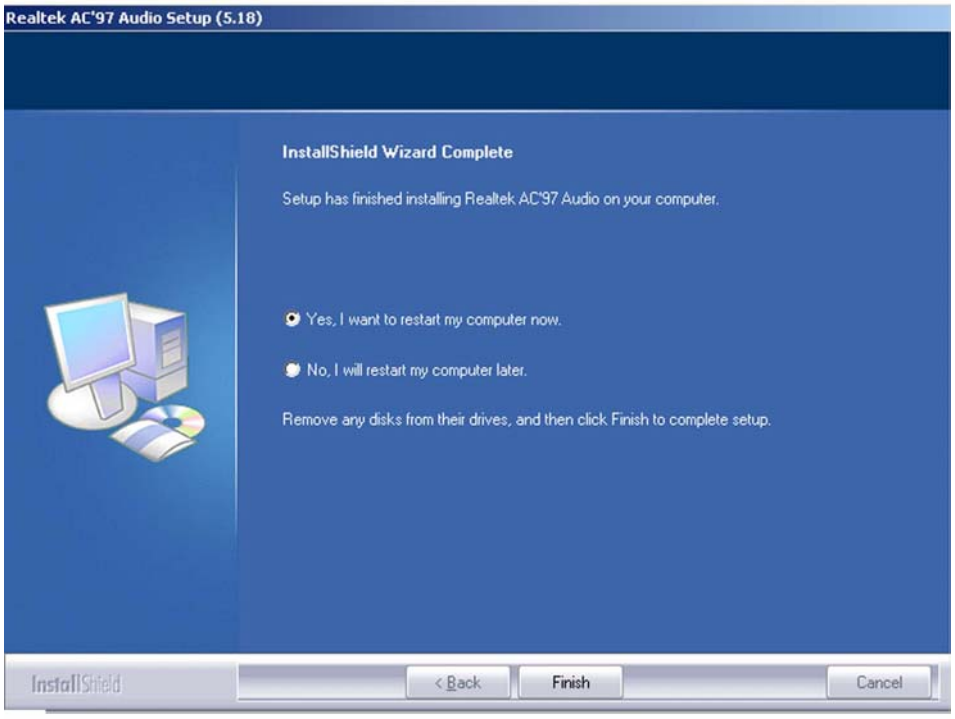
Realtek AC'97 Audio Setup (5.18)
InstallShield Wizard Complete
Setup has finished installing Realtek AC'97 Audio on your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
InstallShield
< Back
Finish
Cancel

Figure 6-12: Audio Driver Installation Complete

Step 8: The confirmation screen shown in **Figure 6-12** allows user to restart the computer immediately after the installation is complete or to restart the computer later. For the settings to take effect the computer must be restarted. Once decided when to restart the computer, click the "**Finish**" button.

6.4 Intel Graphics Media Accelerator Driver

To install the GMA driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the NOVA-8522G2. Open the CD folder and locate the icon for the **Setup** installation file. Once located, use the mouse to double click the icon.

Step 2: Once double clicking the Setup icon, a Welcome screen shown in **Figure 6-13** appears.

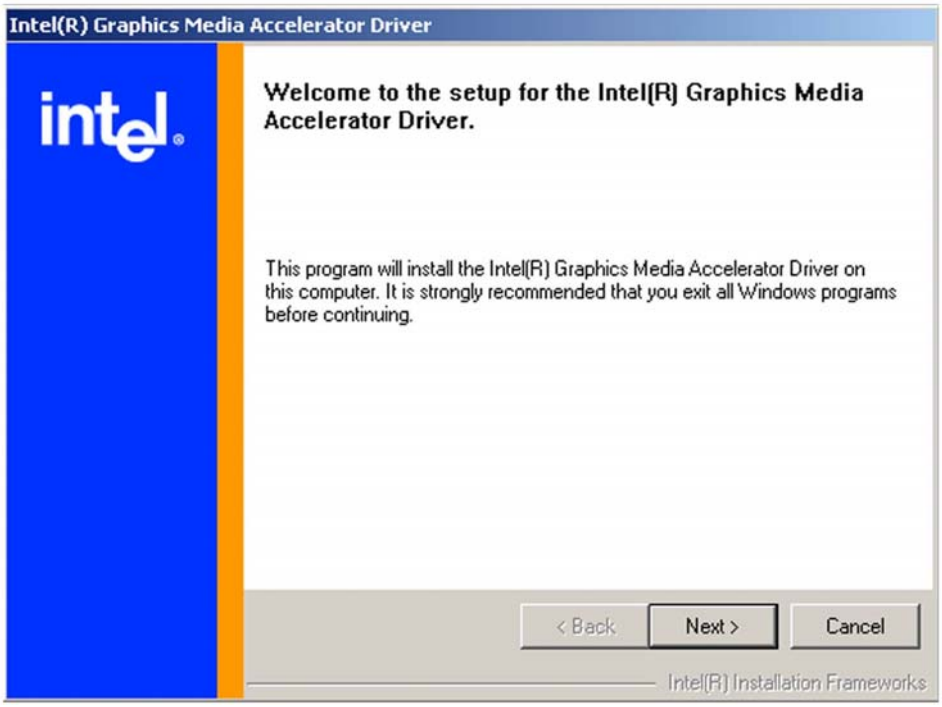
Intel(R) Graphics Media Accelerator Driver
intel
Welcome to the setup for the Intel(R) Graphics Media Accelerator Driver.
This program will install the Intel(R) Graphics Media Accelerator Driver on this computer. It is strongly recommended that you exit all Windows programs before continuing.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 6-13: GMA Driver Installation Welcome Screen

Step 3: To continue installing click "**Next**" and a license agreement shown in **Figure 6-14** appears. Read through the license agreement.

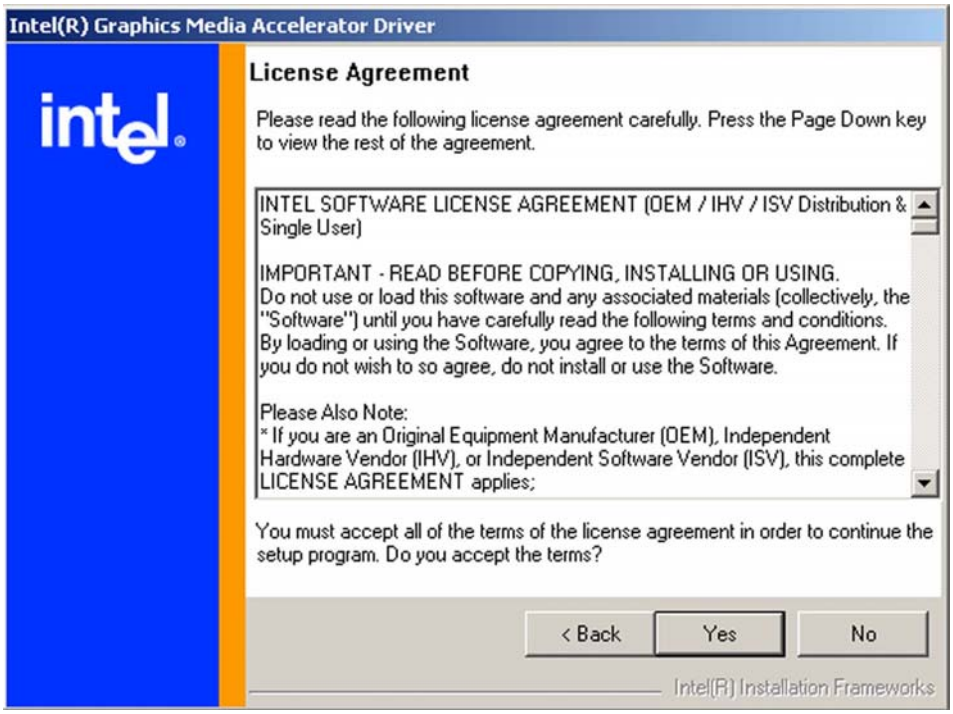
Intel(R) Graphics Media Accelerator Driver
intel
License Agreement
Please read the following license agreement carefully. Press the Page Down key to view the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
< Back
Yes
No
Intel(R) Installation Frameworks

Figure 6-14: GMA Driver License Agreement

Step 4: Accept the terms and conditions stipulated in the license agreement by clicking the "**Yes**" button (**Figure 6-14**). The installation notice shown in **Figure 6-15** appears.

Figure 6-15: GMA Driver Installing Notice

Step 5: After the driver installation process is complete, a confirmation screen shown in **Figure 6-16** appears.

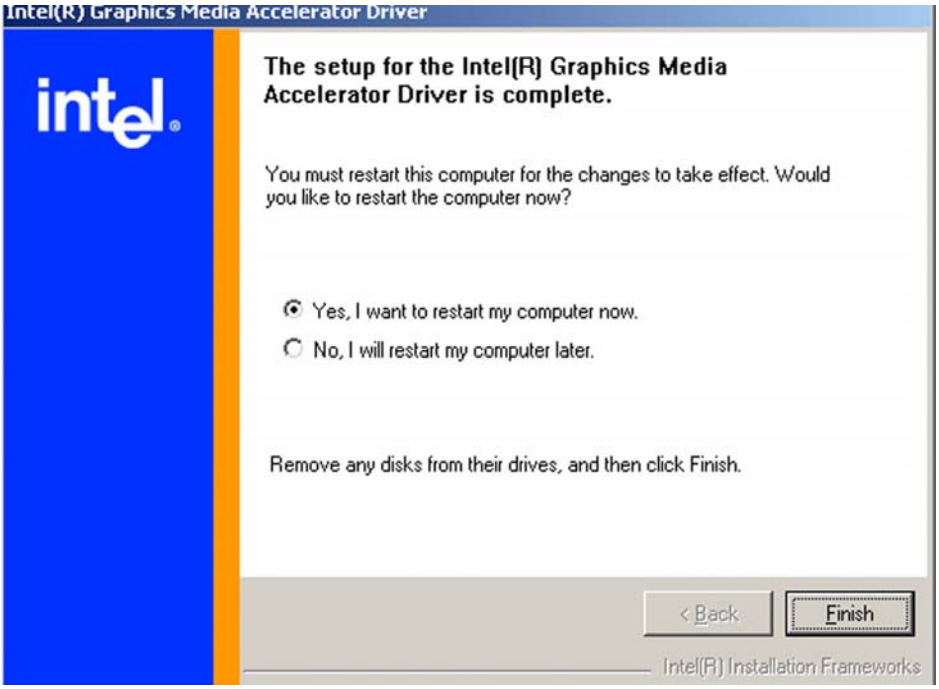
Intel(R) Graphics Media Accelerator Driver
intel
The setup for the Intel(R) Graphics Media Accelerator Driver is complete.
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish.
< Back
Finish
Intel(R) Installation Frameworks

Figure 6-16: GMA Driver Installation Complete

Step 6: The confirmation screen shown in **Figure 6-16** allows user to restart the computer immediately after the installation is complete or to restart the computer later. For the settings to take effect the computer must be restarted. Once decided when to restart the computer, click the "**Finish**" button.

6.5 LAN Driver Installation

To install the LAN driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the NOVA-8522G2. Open the **LAN** directory and locate the icon for the relevant **Setup** installation file. Once located, use the mouse to double click the icon.

Step 2: Once double clicked the Setup icon, a LAN License Agreement screen shown in **Figure 6-17** appears.

DriverInstaller - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
INTEL SOFTWARE LICENSE AGREEMENT
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
I accept the terms in the license agreement
I do not accept the terms in the license agreement
InstallShield
< Back
Next >
Cancel

Figure 6-17: LAN License Agreement

Step 3: Accept the License Agreement by clicking "**Next**." The follow-up window prompts for the directory the driver is stored in. (See **Figure 6-18**)

DriverInstaller - InstallShield Wizard
Location to Save Files
Where would you like to save your files?
Please enter the folder where you want these files saved. If the folder does not exist, it will be created for you. To continue, click Next.
Save files in folder:
c:\IntelPRO
Change...
InstallShield
< Back
Next >
Cancel

Figure 6-18: Select the Driver Directory

Step 4: After selecting the directory the driver is installed in, click "**Next**." The screen in **Figure 6-19** appears.

Figure 6-19: LAN Driver Configuration

Step 5: In Figure 6-19, there are three options.

- Install Base Driver → Installs the base driver
- Make Driver Disk → Copies the driver to disk
- View Release Notes → Opens word document of the release notes

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Appendix

A

BIOS Configuration Options

A.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 5**.

- ➔ System Overview 98
- ➔ Intel ® SpeedStep ™ tech. 101
- ➔ OnBoard PCI IDE Controller [Both] 103
- ➔ Onboard PCI IDE Operate Mode [Legacy Mode] 103
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- ➔ ZIP 106
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- ➔ Block (Multi Sector Transfer) [Auto] 106
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➔ Discard Changes and Exit 142
➔ Discard Changes..... 143
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➔ Load Failsafe Defaults..... 143

Appendix

B

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table B-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT      15H
 ;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP      EXIT_AP, 1     ;is the application over?
        JNE       W_LOOP        ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT      15H
;
; EXIT ;
```

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Appendix

C

Address Mapping

C.1 IO Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	SiS661CX Graphics Controller
3C0-3DF	SiS661CX Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table C-1: IO Address Map

C.2 1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

Table C-2: 1st MB Memory Address Map

C.3 IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	LAN
IRQ3	COM2	IRQ11	LAN/USB2.0/SATA
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

Table C-3: IRQ Mapping Table

C.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table C-4: IRQ Mapping Table

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Appendix

D

External AC'97 Audio CODEC

D.1 Introduction

The motherboard comes with an onboard Realtek ALC655 CODEC. Realtek ALC655 is a 16-bit, full duplex AC'97 Rev. 2.3 compatible audio CODECwith a sampling rate of 48KHz.

D.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through a connector on the NOVA-8522G2G motherboard. Connect the audio kit to the connector.

D.1.2 Driver Installation

The driver installation has been described in Chapter 6 ction 6.3

After rebooting the sound effect configuration utility appears in the Windows Control Panel (see **Figure 6-20**). If the peripheral speakers are properly connected, sound effects should be heard.

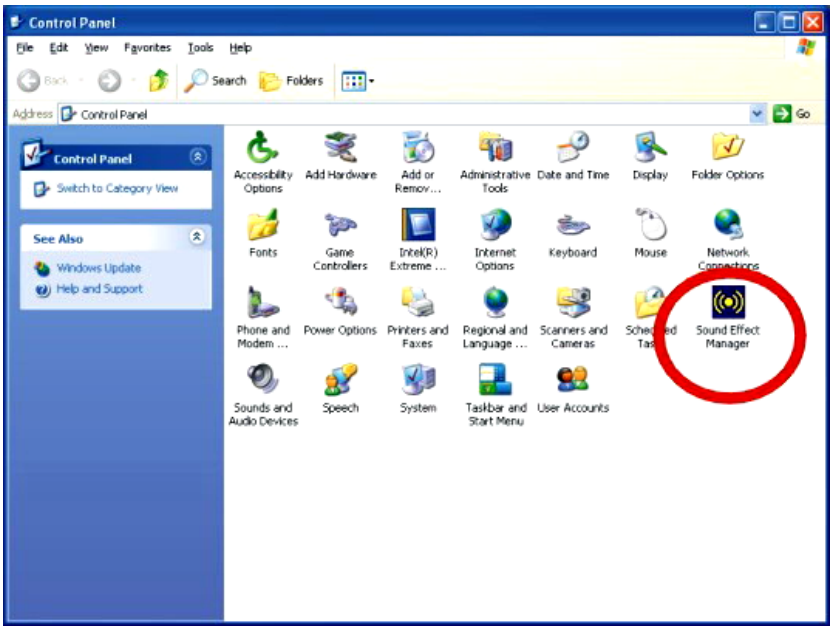

Figure 6-20: Sound Effect Manager con

D.2 Sound Effect Configuration

D.2.1 Accessing the Sound Effects Manager

To access the **Sound Effects Manager**, please do the following:

Step 6: Install the audio CODEC driver.

Step 7: Click either:

- The Sound Effect Manager icon in the Notification Area of the system task bar (see Figure 6-21), or
- The Sound Effect Manager icon in the Control Panel (Figure 6-22).

Figure 6-21: Sound Effect Manager Icon [Task Bar]

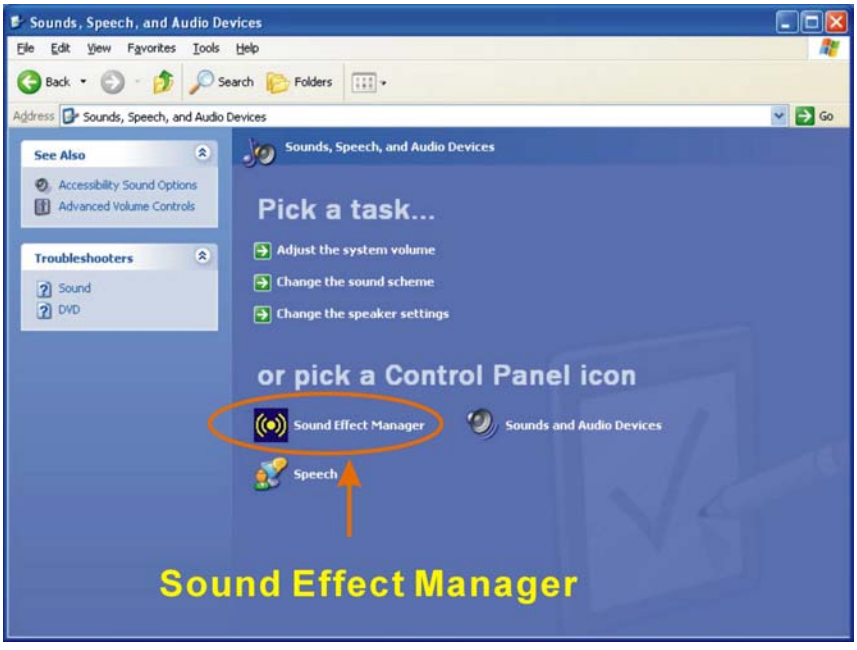

Figure 6-22: Sound Effect Manager Icon [Control Panel]

Step 8: The sound effect manager appears. (See **Figure 6-23**)

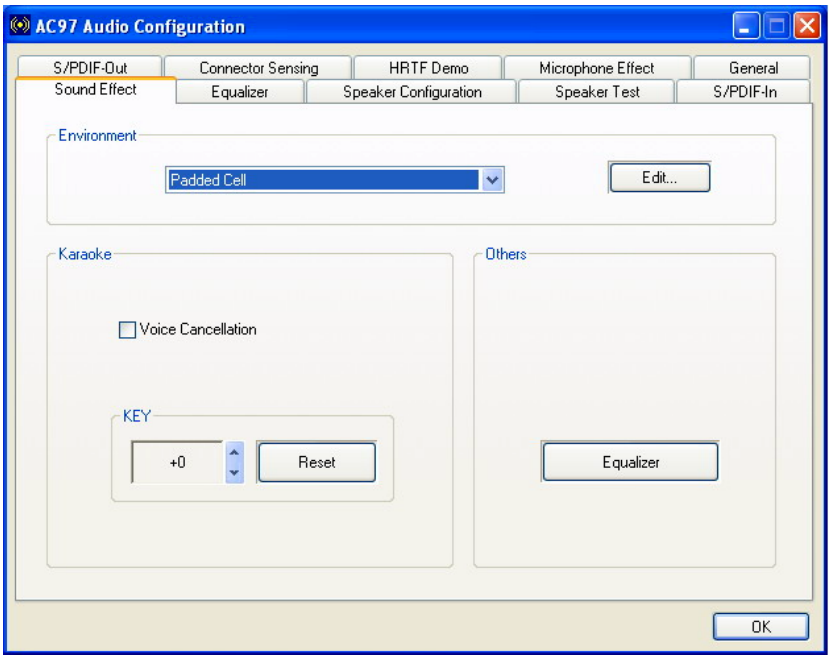

Figure 6-23: Sound Effects Manager (ALC655)

NOTE:

The Sound Effect Manager shown in **Figure 6-23** is for the RealTek ALC655 audio CODEC. Different CODECs may have different sound manager appearances.

The following section describes the different configuration options in the Sound Effect Manager.

D.2.2 Sound Effect Manager Configuration Options

The **Sound Effects Manager** enables configuration of the items listed below. To configure these items click the corresponding menu tab in the **Sound Effects Manager** in **Figure 6-23**.

NOTE:

The **Karaoke Mode** is configured in the **Sound Effect** menu. To access Karaoke configuration settings, click on the **Sound Effect** menu tab.

- Sound Effect
- Karaoke Mode
- Equalizer
- Speaker Configuration
- Speaker Test
- S/PDIF-In
- S/PDIF-Out
- Connector Sensing
- HRTF Demo
- Microphone Effect
- General

NOTE:

Not all RealTek **Sound Effect Managers** have all the above listed options. The Sound Effect Manager loaded onto the system may only have some of the options listed above.

Below is a brief description of the available configuration options in the **Sound Effects Manager**.

- ***Sound Effect***:- Select a sound effect from the 23 listed options in the drop down menu. Selected sound effect properties can be edited. To edit the sound effect click "**EDIT**."
- ***Karaoke Mode***:- The **Karaoke Mode** is accessed in the Sound Effect window. The **Voice Cancellation** disables the vocal part of the music being played. The **Key adjustment** up or down arrow icons enables users to define a key

that fits a certain vocal range.

- ***Equalizer Selection***:- Preset equalizer settings enable easy audio range settings. Ten frequency bands can be configured.

- ***Speaker Configuration***:- Multi-channel speaker settings are configured in this menu. Configurable options include:
  - Headphone
  - Channel mode for stereo speaker output
  - Channel mode for 4 speaker output
  - Channel mode for 5.1 speaker output
  - Synchronize the phonejack switch with speakers settings

- ***Speaker Test*:-** Each speaker connected to the system is tested individually to see if the 4-channel or 6-channel audio operates properly.

- ***S/PDIF-In & S/PDIF-Out***:- These functions are currently not supported.

- ***Connector Sensing***:- Realtek ALC655 detects if an audio device is plugged into the wrong connector. If an incorrect device is plugged in a warning message appears.

- ***HRTF Demo***:- Adjust HRTF (Head Related Transfer Functions) 3D positional audio here before running 3D applications.

- ***Microphone Effect***:- Microphone noise suppression is enabled in this menu.

- ***General***:- General information about the installed AC'97 audio configuration utility is listed here.

Appendix

E

RAID Setup

E.1 Introduction

The Silicon Image SATA RAID chipset can control parallel ATA (PATA) and serial ATA (SATA) disks.

CAUTION!

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contingent storage space. The operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

E.1.1 Precautions

One key benefit a RAID configuration brings is that a single hard drive can fail within a RAID array without damaging data. With RAID1 array, a failed drive can be replaced and the RAID configuration restored.

WARNING!

Irrecoverable data loss occurs if a working drive is removed when trying to remove a failed drive. It is strongly recommended to mark the physical connections of all SATA disk drives. Drive locations can be identified by attaching stickers to the drive bays. If a drive member of a RAID array should fail, the failed drive can then be correctly identified.

CAUTION!

Do not accidentally disconnect the SATA drive cables. Carefully route the cables within the chassis to avoid system down time.

E.2 Features and Benefits

- Supports RAID levels 0 and 1
- Supports connectivity to two disk drives
- Supported Operating Systems include: Windows 98/Me, Windows 2000 and Windows XP
- Windows-based software for RAID management

E.3 Installing the RAID Components

E.3.1 Install the Silicon Image RAID Host Adapater Driver

To access the **Silicon Image RAID Utility**, using a Windows Server 2003, XP, 2000, 98 or NT please follow the steps below:

NOTE:

If an alternative operating system is being used, please refer to the Silicon Image installation guidelines that can be accessed at http://www.siliconimage.com/docs/SATARaid%20Manual%20v1.03.pdf.

Step 1: **Connect SATA drives to the system**. Connect two SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

NOTE:

Make sure the SATA drives are EXACTLY the same when they are configured in a RAID configuration (RAID 0 or RAID 1). If they are not the same size, disk drive capacity is sacrificed and overall performance affected.

Step 2: When Windows detects the newly installed SATA host adapter, it will open a Driver Installation Wizard.

Step 3: Click on the Next buttons until the wizard prompts for the location of the driver.

Step 4: Insert the Silicon Image SATA host adapter driver CD into the computer's CDROM drive and click on the Browse button.

Step 5: Select the directory on the CD in which the driver resides and click OK.

Step 6: Click the Next button. A window will be displayed to verify proper installation of the host adapter driver.

Step 7: Click **Finish**.

Step 8: When prompted to restart the computer, click **Yes**.

E.3.2 Install the JAVA 2 Runtime Environment

The Java 2 Runtime Environment is required for the SATA Raid GUI. To install the JAVA 2 Runtime Environment, please do the following:

Step 1: Download the Java 2 Runtime Installer and executable package from the Sun Microsystems website at http://java.sun.com/j2se/downloads.html. To do this the computer must have an Internet connection set up before installation can proceed.

Step 2: Save the installer file to a known location

Step 3: Select the installation file and open it. The installation begins and the installation program is downloaded from the internet.

Step 4: When asked to accept the license agreement, click **Next**.

Step 5: When the installation completes, click **Finish**.

Step 6: Restart the computer when prompted.

E.3.3 Install the RAID GUI

To install the Silicon Image RAID GUI, please follow the steps below.

Step 1: Insert the RAID installation CD into the CD-ROM drive.

Step 2: Display the contents of the CD-ROM.

Step 3: The SATARaid GUI Installation program is named Java SATARaid.exe. Select this file and open it. The installation begins.

Step 4: Click the Next button when the Welcome window appears.

Step 5: Click the Next button to install the GUI program in the default directory.

Step 6: Click the Finish button to complete the installation.

E.4 Setting RAID Options

Once the GUI is installed, use the GUI functions to configure the SATA RAID. For further information on installing the RAID functions, please download the Silicon Image RAID manual from http://www.siliconimage.com/docs/SATARaid%20Manual%20v1.03.pdf.

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